FINAL

BIOLOGICAL ASSESSMENT/EVALUATION

for
Threatened, Endangered, Proposed, and Sensitive Wildlife Species that
May be Affected by the

MOUNT ASHLAND LATE-SUCCESSIONAL RESERVE HABITAT RESTORATION AND FUELS REDUCTION PROJECT

OAK KNOLL RANGER DISTRICT, KLAMATH NATIONAL FOREST

PROJECT LOCATION:
Sections 15-18, 20-22, and 28 of Township (T) 48N, Range (R) 8W, Mt. Diablo Meridian; Sections 25, 26 and 34-36 of T 40S, R1W, Willamette Meridian (WM); Sections 17, 19-21, 28-33, T40S, R1E, WM; Sections 1-3 and 10-15, T41S, R1W, WM; Sections 5-8 and 17-18, T41S, R1E, WM.

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Wildlife Biological Assessment for the Mount Ashland Late Successional Reserve Habitat Restoration and Fuels Reduction Project

1. INTRODUCTION:

The purpose of this biological assessment/biological evaluation (BA) is to determine the effects of the Mount Ashland Late Successional Reserve Habitat Restoration and Fuels Reduction Project (project) on wildlife species listed as Endangered or Threatened under the Endangered Species Act; on designated Critical Habitat for those species; and on species listed as Sensitive by the Pacific Southwest Region, USDA Forest Service (FS).

This BA is prepared in accordance with the legal requirements set forth under Section 7 of the Endangered Species Act of 1973, as amended [16 U.S.C. 1536 (c) *et seq. 50CFR 402*] (ESA), and follows the standards established in the FS Manual direction (FSM 2672.42; USDA Forest Service 1991).

The list of federally listed species was obtained online at http://arcata.fws.gov/specieslist (reference #430301162-112139). The FS, Region 5, Sensitive Species list was provided by the USDA Pacific Southwest Region (March 3, 2005). This BA addresses the following species from those lists:

Endangered

Shortnose sucker (*Chamistes brevirostris*)
Lost River sucker (*Deltistes luxatus*)
Tidewater goby (*Eucyclogobius newberryi*)

Threatened

Northern spotted owl (*Strix occidentalis caurina*)
Bald eagle (*Haliaeetus leucocephalus leucocephalus*)
Marbled murrelet (*Brachyramphus marmorata*)

Sensitive

Peregrine falcon (*Falco peregrinus anatum*)
Northern goshawk (*Accipter gentiles*)
Great gray owl (*Strix nebulosa)*
Swainson's hawk (*Buteo swainsoni*)
Willow flycatcher (*Empidonax trailii*)
Greater sandhill crane (*Grus canadensis tabida*)
California wolverine (*Gulo gulo luteus*)
Pacific fisher (*Martes pennanti pacifica*)
American marten (*Martes americana*)
Sierra Nevada red fox (*Vulpes vulpes necator*)
Pallid bat (*Antrozous pallidus*)
Townsend's big-eared bat (*Corynorhinus townsendii*)
Northwestern pond turtle (*Emys marmorata marmorata*)
Foothill yellow-legged frog (*Rana boylii*)
Cascade frog (*Rana cascade*)

Southern torrent salamander (*Rhyacotriton variegates*)
Siskiyou Mountain salamander *(Plethodon stormi)*
Blue-gray taildropper slug *(Prophysaon coeruleum)*
Tehama chaparral snail *(Trilobopsis tehamana)*

Critical Habitat

Northern spotted owl, designated January 15, 1992.
Marbled murrelet, designated May 24, 1996.
Tidewater goby, designated Novemebr 20, 2000.

The project is not within the range of the marbled murrelet (coastal forests), southern torrent salamander (streams within coastal forests) or the Sierra Nevada red fox (Cascades Mountains and Sierran Crest). Habitat for the Swainson's hawk (perennial grassland, grassy shrub-steppe, or agricultural landscapes), greater sandhill crane (wetlands, marshes, grasslands, or irrigated fields), shortnose and Lost River suckers (lakes and their tributaries), and tide water goby (coastal lagoons, estuaries and streams a short distance from these habitats) does not occur in the project area. Critical habitat for the marbled murrelet and tidewater goby does not occur in the project area. These species and designated critical habitat will not be addressed further in this document.

II. CONSULTATION TO DATE

The Project Initiation Letter was presented to the USFWS Klamath National Forest (KNF) Level 1 representative Dave Johnson on June 7, 2004. Since that time USFWS wildlife biologists Dave Johnson and/or Cliff Oakley have participated in all Interdisciplinary Team (IDT) meeting. At these meetings the IDT has discussed all aspects of project development including stands to treat, treatment options, impacts to watersheds and wildlife, and supporting activities. Dave Johnson and Cliff Oakley also spent a combined 60 days in the field reviewing stands, assessing appropriate treatments, and developing the supporting activities. The Draft BA was submitted to the Level One team on June 22, 2007 and a final BA was agreed upon on July 2, 2007.

III. CURRENT MANAGEMENT DIRECTION

Programmatic management direction for the Forest is provided by the Klamath Land and Resource Management Plan (KLRMP) (USDA Forest Service 1994). The KLRMP incorporates direction in the Record of Decision for Amendments to the Forest Service and Bureau of Land Management Planning Documents within the Range of the Northern Spotted Owl – also known as the Northwest Forest Plan (NWFP) (USDA Forest Service & USDI Bureau of Land Management 1994a). The KLRMP was developed utilizing the guidelines provided by the Forest and Rangeland Renewable Resource Planning Act of 1974, as amended by the National Forest Management Act of 1976, and the National Environmental Policy Act of 1976.

NWFP direction for Survey and Manage species was revised by the Record of Decision and Standards and Guidelines for Amendments to the Survey and Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines, January 2001 (USDA

Forest Service & USDI Bureau of Land Management 2001). The project is consistent with this direction.

IV. DESCRIPTION OF THE PROJECT AREA

Location and background: The project occurs within the California Klamath and Oregon Klamath Mountains physiographic provinces (USDA Forest Service and USDI Bureau of Land Management 1994b) and is approximately 6 miles west of Hilt, California, and 15 miles south of Ashland, Oregon. The project is located on the Oak Knoll Ranger district which is administered by the Scott/Salmon Ranger District. The legal location is Township 40S, Range 10W, Sections 26 and 34-36: T40S, R1E, Sections 29-32; T41S, R1W, Sections 1-3, 10-12, and 13-15; T41S, R1E, Sections 4-8, and 18; T48N, R8W, Sections 15-18, 20-22, and 28. The project area occupies approximately 13,000 acres and is located within the Beaver-Grouse, Long John, Deer-Beaver, Upper Cow, and Headwaters of Cotton wood Creek 7th field watersheds. The current condition, reference condition, and desired future condition of the project area have been assessed in the Beaver Creek Ecosystem Analysis (USDA Forest Service 1996a) and the Mount Ashland Late-successional Reserve Assessment (USDA Forest Service 1996b). Elevations in the project area range from 3200 to 6700 feet. Unless otherwise noted, the project area is the analysis area for the purpose of adressing potential effects of the proposed action.

Prior to European settlement, the majority of the Beaver Creek watershed, which includes the project area, was late-successional mixed conifer forest. Historically, ponderosa pine and sugar pine dominated stands on south and west aspects, comprising up to 60 percent of the conifers in these stands. Douglas-fir was primarily found on the lower third of slopes on these aspects. North and east aspects were dominated by Douglas-fir and white fir with the true fir community occupying the higher elevation areas.

During the railroad logging era (1910 through approximately 1932), much of the project area, which was in private ownership, was harvested. During this time large diameter trees were targeted and it is estimated that up to 90 percent of the trees on the landscape were removed. Beginning in 1932, several land exchanges between private landowners and the FS occurred, resulting in the majority of the project area being acquired by the KNF. Following these acquisitions the KNF conducted regeneration and partial cuts during the 1950s – 1970s, further contributing to changes in distribution and abundance of late-successional stands.

Historically, fires were common in the Siskiyou Mountains and played an important role in the distribution of forest types and successional stages. The general fire regime within the Klamath Mountains Bioregion (northwestern California and southwestern Oregon) was frequent, low- to moderate-intensity fire (Skinner et al. 2006). Under this regime, stands were generally open and the landscape was characterized by a mosaic of successional stages and a high degree of spatial complexity due to the creation of openings of variable size within the forest matrix (Taylor & Skinner 1998; Taylor & Skinner 2003). However, successful fire suppression over most of the last century has reduced the level of complexity and altered the composition and distribution of tree species.

Vegetation composition and stand structure have been dramatically altered as a result of fire suppression and historic logging practices. Most of the area harvested during the railroad logging era has regenerated naturally and is dominated by stands in an early- or mid-successional forest stage. Generally, these stands lack large, complex vertical and horizontal structure (openings, large diameter trees, especially those with deformities or cavities; large branches; large diameter standing dead trees and logs; multi-storied canopies; etc.) and thus do not provide habitat for late-successional forest associated species.

Vegetation within the project area is inconsistent with, and continues to trend away from, historic conditions that are more ecologically sustainable. Eighty-three percent of the project area is either moderately or severely inconsistent with historic vegetation conditions (Fire Regime Condition Class 2 or 3), containing overly dense stands of smaller trees and accumulations of highly flammable woody debris. Currently, the project area is dominated by Douglas-fir and white fir at mid-elevations and true fir above 5,000 feet in elevation. White fir is more abundant at mid-elevations and occupies more lower-elevation sites than was observed historically. Many of the stands on south and west aspects historically dominated by pine currently contain a mix of conifer species and are often dominated by fir species. Species composition in the area occupied by true fir (higher elevations) is not markedly different from historic times. However, many of these stands are more densely stocked and contain heavier fuel loads as a result of fire suppression.

V. DESCRIPTION OF THE PROPOSED ACTION

The project has been designed to promote the development of late-successional habitat by reducing stocking levels in overstocked stands and to create stands that are more resilient to wildfire by reducing surface and ladder fuels and restoring the landscape to a species composition more resembling historic conditions. The activities proposed for the project are listed below. See Table 1 for information specific to the alternatives.

(a) Primary Elements of the Project:

- **Restoration Thinning to Promote the Development of Late-successional Stands**: This treatment is proposed in early- and mid-successional stands and is designed to promote the development of late-successional habitat. This treatment includes variable density thinning of trees greater than 9" in areas and thinning of trees less than 9" in plantations and naturally regenerated stands. See Table 2 for a description of thinning prescriptions. Restoration thinning includes felling and yarding of merchantable trees using helicopter, cable, and ground based systems.

- **Thinning to Create Defensible Fuel Profile Zones:** This treatment is proposed along major ridges and is designed to break up the continuity of existing fuels and provide an anchor point for fire suppression and prescribed burning activities. The focus of this treatment will be thinning of small diameter trees to control density and will favor the shade-intolerant, fire resistant species. Thinning to create DFPZs includes felling and yarding of merchantable trees using helicopter, cable, and ground based systems.

- **Weeding and Cleaning**: This treatment consists of removing or thinning understory trees within the habitat promotion and DFPZ stands.

- **Fuels Reduction Treatments**: These treatments include mastication of activity generated and natural fuels, handpiling and burning of activity-generated and natural fuels, underburning to reduce activity-generated and natural fuels, and thinning of trees less than 9" in riparian reserves to reduce surface and ladder fuels. Whole tree removal on slopes less than 45 percent may occur to reduce activity-generated fuels.

- **Support Actions**: These activities include modification of landings to accommodate processing of small trees for biomass utilization, landing construction, temporary spur construction, road closures, road decommissioning, road maintenance, and designating existing unauthorized roads as National Forest System Roads.

(b) Timing of the Project

- Silvicultural treatments will commence upon signing of the Record of Decision and may take up to 5 years to complete.
- Fuels treatments will occur approximately 3-5 years after silvicultural treatments are completed.

(c) Project Design Features: Northern spotted owl

- A seasonal restriction of February 1st to September 15th will apply to all activities that modify[1] habitat (including activities that degrade or are beneficial) within 0.25 mile of a NSO activity center or unsurveyed suitable habitat. This same restriction also applies to activities that remove or downgrade suitable habitat within 0.7 mile of an activity center or unsurveyed suitable habitat.

- A seasonal restriction of February 1st to July 9th will apply to all activities that that create noise above ambient levels within 0.25 mile of an occupied activity center or unsurveyed suitable habitat.

[1] For the purpose of this BA modify refers to activities that changes forest structure; remove refers to activities that change suitable habitat to non-habitat; downgrade refers to activities that change nesting/roosting habitat to foraging or dispersal habitat or foraging habitat to dispersal habitat; and degraded refers to activities that modify habitat but the function of the stand is retained post treatment.

- A seasonal restriction of February 1st to July 9th will apply to all activities that that create smoke within 0.25 mile of an occupied activity center or unsurveyed suitable habitat.

- No more than 35 percent of the suitable habitat within an occupied NSO core area and no more than 25 percent of the suitable habitat within an occupied NSO homerange will be underburned annually.

- When burning in spring, smoke is managed so that light to moderate smoke is may be present within a canyon or drainage but dissipates or lifts within 24 hours. If heavy or concentrated smoke begins to inundate occupied nesting/roosting habitat or occupied activity centers late in the afternoon, ignition should be discontinued.

- If protocol surveys indicate that historic activity centers and/or suitable habitat are not occupied by breeding NSOs, seasonal restrictions may be waived.

Two maps are provided for this Biological Assessment/Evaluation. Map 1 includes the proposed action (treatment stands, yarding systems, proposed landings, and proposed temporary spur road construction. Map 2 includes NSO nesting/roosting, foraging, and dispersal habitat and estimated core area and home ranges of historic activity centers.

VI. EFFECTS ON WILDLIFE SPECIES

Federally Listed Species

Northern Spotted Owl

A. Environmental Baseline

Reasons for Listing*:* The NSO was listed as Threatened under the Endangered Species Act on June 26, 1990, due to widespread habitat loss and the inadequacy of existing regulatory mechanisms to provide for its conservation (USDI Fish and Wildlife Service 1990a).

Species Range. The distribution of the NSO includes southwestern British Columbia, Washington and Oregon, and northwestern California south to Marin County (Gutiérrez 1996). The project area lies in northwestern California and south western Oregon in the Klamath Mountains within the range of the NSO.

Habitat: NSOs generally inhabit older forested habitats because they contain the structures and characteristics required for nesting, roosting, foraging, and dispersal (Forsman et al. 1984; Gutiérrez 1996; LaHaye & Gutiérrez 1999). Specifically, habitat features that support nesting and roosting include a multi-layered, multi-species canopy dominated by large overstory trees; moderate to high canopy closure (60 to 90 percent); a high incidence of trees with large cavities or other types of deformities (e.g., broken tops, mistletoe, etc.); numerous large snags; an abundance of large, dead wood on the ground;

and open space within and below the upper canopy for NSOs to fly within (Thomas et al. 1990). Basal area within nest stands often exceeds 200 ft^2/acre (Solis & Gutiérrez 1990). Foraging habitat generally consists of attributes similar to those in nesting and roosting habitat, but much variation exists over the NSO range. Recent research addressing spotted owl foraging habitat in California, suggests that the basal area of a stand influences use, with 160-240 ft^2/acre basal area providing optimal foraging conditions (Irwin et al 2004; Irwin et al 2006). Dispersal habitat, at minimum, consists of stands with adequate tree size and canopy closure ($\geq$ 40 percent) to provide protection from avian predators and some foraging opportunities (USDI Fish and Wildlife Service 1992).

Physiographic features (i.e., slope position, distance to water) also appear to influence habitat used for nesting, roosting, or foraging (Solis & Gutiérrez 1990; Blakesley et al. 1992; LaHaye & Gutiérrez 1999; Folliard et al. 2000; Irwin et al. 2004; Irwin et al. 2006). Studies from northern California indicate that NSOs typically nest and roost on the lower ½ of slopes within a given drainage while avoiding the upper 1/3 of slopes. Similarly, both California spotted owls and NSOs generally forage on lower slopes adjacent to streams.

Recent landscape-level analyses suggest that in the southern portion of the subspecies' range a mosaic of large patches of late-successional habitat interspersed with other vegetation types may benefit NSOs more than large, homogeneous expanses of older forests (Franklin et al. 2000; Zabel et al. 2003; Olson et al. 2004). Franklin et al. (2000) hypothesized that a mosiac of different vegetation and seral stages may offer a stable prey resource for NSOs while providing adequate protection from predators. Franklin et al. (2000) and Dugger et al. (2005) also reported habitat fitness potential (the potential fitness that can be achieved by an owl occupying a given territory with certain habitat components) was greater where large amounts of older forest were present in the NSOs core area.

Home Range: Home range size varies geographically, likely in response to differences in habitat quality (USDI Fish and Wildlife Service 1990b). Home ranges are smaller during the breeding season and often increase dramatically in size during fall and winter (Forsman et al. 1984; Glenn et al. 2004). The average home range size is approximately 3,300 acres in the California Klamath Province. Bingham & Noon (1997) defined the portion of the owls home range that receives disproportionate use as the core area. Radiotemetery studies in northern California and the western Oregon Cascades indicate that NSO core areas are typically between 500 to 900 acres (Bingham & Noon 1997; Irwin et al. 2000). The amount of suitable habitat within a home range has also been shown to influence NSO productivity and survivorship (Simon-Jackson 1989; Bart 1995; Franklin et al. 2000; Dugger et al. 2005).

Reproductive Biology: Nesting typically occurs from March to June. At about 35 days old, the young leave the nest but are incapable of flight (Forsman 1976). Juveniles typically spend the summer in close proximity to the nest core (Forsman et al. 1984, Miller 1989). Forsman et al. (2002) referred to this area occupied by juveniles after leaving the nest but before dispersing as the natal territory. Juveniles may begin to disperse by September (Forsman et al. 1984; 2002).

Dispersal: Most young disperse by early November (Forsman et al. 1984; 2002). In addition to dispersing juveniles, a small percentage of non-juveniles disperse in search of new mates and/or territories (Forsman et al. 2002). Dispersing owls typically traversed a wide range of forest conditions and levels of habitat fragmentation. Large non-forested valleys (e.g., the Willamette Valley) are apparent barriers to dispersing juvenile and adult NSOs (Ibid).

Prey: Composition of prey in NSO diet varies likely in response to prey availability (Carey 1993; Forsman et al. 2001). Northern flying squirrels (*Glaucomys sabrinus*) and woodrats (*Neotoma* spp.) are usually the predominant prey both in biomass and frequency (Forsman et al. 1984; Ward et al. 1998; Forsman et al. 2001, 2004) with woodrats generally the dominant prey item in the drier forests typically found in the southern portion of the NSO range (Forsman et al. 1984; Sztukowski & Courtney 2004). Other prey species (e.g., voles, mice, rabbits and hares, birds, and insects) may be seasonally or locally important (Rosenberg et al. 2003; Forsman et al. 2004).

Dusky footed woodrats are arboreal herbivores generally found below 5,000 feet (Williams et al. 1992). Nests are built of sticks or other woody debris and are typically located on the ground but may also be found in shrubs, trees, or rock crevices (Ibid). Dusky-footed woodrat densities appear to follow stages influenced by habitat quality (Hamm 1995; Sakai & Noon 1993; Carey et al. 1999) with the highest densities found in sapling/bushy pole timber and older forests with brush understories. Intermediate aged forests with little understory appear to be poorly suited for dusky-footed woodrats. Although not abundant, habitat for dusky-footed woodrats in the project area occurs in regenerating plantations and with some riparian reserves.

Northern flying squirrels are nocturnal rodents that nest in trees in a variety of forest communities (Williams et al. 1992). Flying squirrel den sites include cavities in live and dead old-growth trees; cavities, stick nests, and moss-lichen nest in second growth trees; cavities in branches of fallen trees; nests in decayed stumps; and witches brooms formed by mistletoe infections (Carey et al. 1997; Carey 2000). Within the project area, habitat for northern flying squirrels is fairly abundant. Camera stations set up for carnivores surveys have confirmed the presence of northern flying squirrels in the project area.

Populations and Trends: Results of the January 2004 NSO demographic meta-analysis workshop indicate that across the range of NSO, populations declined at an average of approximately 3.7 percent per year from 1985–2003 (Anthony et al. 2006). The number of populations that have declined and the rate at which they have declined are noteworthy, particularly the precipitous declines in Washington. Populations on the demographic study areas closest to the project area, Oregon south Cascades and northwest California, appear to be stable and experiencing a slight decline during the same time period, respectively (Ibid).

According to the Forestwide LSR Assessment (USDA Forest Service 1999), there have been approximately 261 NSO activity centers located on the KNF. Because portions of the KNF have never been surveyed and survey efforts have been reduced in the recent past, the actual number of occupied sites is unknown. However, surveys conducted in 2002-2005 by the USFS and USFWS in the Collins-Baldy, Johnny O'Neil, and the Mount Ashland LSRs indicate that current activity centers are similar to those reported in 1999.

Threats (existing and potential):

1. **Habitat Trends**: The amount of NSO habitat continues to decline on a range-wide basis across all ownerships, although at a rate that is less than in the years prior to the listing of the NSO, particularly on Federal lands within the NWFP boundary (Bigley & Franklin 2004). Existing habitat trends are a function of both management actions and natural events.

2. **Wildfire**. At the time of listing, the USFWS recognized that catastrophic wildfire posed a threat to the NSO (USDI Fish and Wildlife Service 1990a). The amount of habitat lost to wildfire in the relatively dry East Cascades and Klamath Provinces suggests that fire may be more of a threat than was previously thought. In the California Klamath Province approximately 15,900 acres of NSO habitat has been lost to fires since 1994 (Bigley 2004), with approximately 5,400 of these acres occurring on the KNF.

3. **Barred Owl**: Since 1990, the barred owl (*Strix varia*) has expanded its range such that it is now roughly coincident with the range of the NSO (Gutiérrez et al. 2004). Barred owls apparently compete with NSOs through a variety of mechanisms: prey overlap (Hamer et al. 2001); habitat overlap (Dunbar et al. 1991; Herter & Hicks 2000; Pearson & Livezey 2003); and agonistic encounters (Leskiw & Gutiérrez 1998; Pearson & Livezey 2003). Recent research and observations also indicate that barred owls may displace NSOs (Kelly et al. 2003) and Anthony et al. (2006) reported that barred owls had a negative effect on NSO survival in three demographic study areas in Washington. Although the barred owl currently constitutes a significantly greater threat to the NSO than originally thought at the time of listing, it is unclear whether forest management has an effect on the outcome of interactions between barred owls and NSO (Gutiérrez et al. 2004).

4. **West Nile Virus and Sudden Oak Death**: Health officials expect that West Nile Virus (WNV) will eventually spread throughout the range of the NSO (Blakesley et al. 2004), but it is unknown how WNV will ultimately affect NSO populations. Sudden Oak Death poses a threat of uncertain proportions because of its potential impact on forest dynamics and alteration of key habitat components (i.e., hardwoods); especially in the southern portion of the NSOs range. Because the magnitude of these threats is unknown at this time, they do not represent relevant information pertinent to analyses conducted for this biological assessment.

Response to Auditory and Visual Disturbance: Although information specific to behavioral responses of NSOs to disturbance is limited, research indicates that recreational activity can cause Mexican spotted owls (*Strix occidentalis lucida*) to vacate otherwise suitable habitat (Swarthout & Steidl 2001) and helicopter overflights can reduce prey delivery rates to nests (Delaney et al. 1999). Additional effects from disturbance, including altered foraging behavior and decreases in nest attendance and reproductive success, have been reported for other raptors (White & Thurow 1985; Andersen et al. 1989; McGarigal et al. 1991).

Suitable Habitat in the Project Area: Historic timber harvest within the project area has impacted NSOs by removing habitat suitable for nesting, roosting, or foraging. Additionally, the stands that have regenerated following timber harvest typically lack the structural attributes and diversity necessary to support nesting pairs (multi-layered and multi-species canopies; large, decadent trees and snags; and large downed woody debris). Past timber harvest has also reduced the amount and recruitment of important habitat components of NSO prey such as large diameter snags and downed woody debris.

Currently, approximately 20 percent of the project area contains suitable NSO habitat. This includes approximately 250 acres of nesting/roosting habitat and 2,500 acres of foraging habitat. An additional 6,000 acres of dispersal quality habitat also exists within the project area. These habitat estimates are based on interpretation of 2005 digital orthophoto quads, field verification during 2004 and 2005, and the KNF NSO habitat layer. Nesting/roosting habitat occurs in small (less than 25 acres), widely scattered patches. Foraging habitat is more widely distributed and occurs in somewhat larger blocks. Dispersal habitat is widely distributed except in the higher elevations of the project area at or near the Siskiyou Crest.

Northwest Forest Plan Late-successional Reserves: Late-successional reserves (LSR) in combination with other land allocations and associated standards and guidelines (S&Gs), were established to maintain a functional, interactive, late-successional and old-growth forest ecosystem. As such, the NWFP represents the primary conservation strategy for NSOs. Within this conservation strategy the primary function of LSRs is to support population clusters.

Desired structural components in LSRs include (1) multispecies and multilayered assemblages of trees, (2) moderate-to-high accumulations of large logs and snags, (3) moderate-to-high canopy closure, and (4) moderate-to-high number of trees with structural imperfections such as cavities, broken tops, and large deformed limbs.

Currently, only 30 percent of the Mount Ashland LSR contains late-successional forest. (For the purpose of this analysis late-successional stands and/or forest is defined as stands with an average tree diameter at breast height $\geq$ 24”). This is approximately 30 percent below the desired amount of late-successional forest for this LSR (USDA Forest Service 1996b; USDA Forest Service 1999). Of the existing late-successional forest, approximately 56 percent occurs in the northern portion of the LSR. Late-successional stands in the northern portion are typically distributed in large contiguous blocks. Late-successional stands in the southern portion of the LSR are considerably more fragmented due primarily to past timber harvest and predominately south facing orientation. Most late-successional stands are located in draws. Some legacy late-successional components from the original stand exist in early- and mid-successional stands but generally large diameter trees, snags, and DWD are lacking in these younger stands. The entire project is located in the southern portion of the Mount Ashland LSR.

Late-successional stands in the Project Area: Prior to timber harvest and fire suppression activities throughout most of the 1900s, the majority of the Beaver Creek 5th field watershed, which includes the project area, was late-sucessional mixed-conifer forest (USDA Forest Service 1996a). This suggests that late-successional stands were well distributed even though late-successional forest in the project area is naturally fragmented due to its historic fire regime, predominately south facing orientation, and naturally occurring openings at higher elevations. Currently, only 1,200 acres (10 percent) of the project area contain late-successional stands. Throughout most of the project area, remnant late-successional stands occur in small patches (typically between 1 to 25 acres) and are not widely distributed. Much of the intervening forest is composed of plantations and early- and mid-successional stands exhibiting high density and canopy closure. Larger, more contiguous patches of late-successional forest exist in the higher elevation portions of the mixed conifer zone and true fir zones but are limited to the northeast corner of the project. Thus, the amount and distribution of late-successional stands are considerably reduced in the project area relative to its historic condition.

When LSRs were designated, not all forested stands within LSRs were in late-successional stage. Thus, the NWFP recognized the role of silviculture in providing and maintaining late-successional components within the LSR network (USDA Forest Service & USDI Bureau of Land Management 1994b). Because many of the early- and mid-successional stands within the project area are young and healthy, they are expected to respond favorably to silvicultural treatments designed to promote the development of late-successional stands.

NSOs in the Project Area: Over the past five years (2002-2006) the project area has been extensively surveyed. In 2002, 2003, and 2006 the entire project area was surveyed. In 2004 and 2005 much of the project area was surveyed for private lands timber harvest operations or activity center verification surveys conducted by the USFWS. The estimated home ranges of 12 historic activity centers overlap the project area and have actions proposed within their boundaries. Surveys conducted in 2006 discovered a new activity center in the Long John Creek drainage. Of these 12 activity centers, seven were occupied in 2006 (2 singles and 5 pairs) and three of the pairs produced young. However, survey data over the past five years indicates that occupancy of these sites and reproductive rates of NSOs in the project area has been low over that time period (Table 2). Because reproductive rates, and to a lesser degree, site occupancy, have been shown to exhibit substantial annual variation (Loschl 2004; Olson et al. 2005; Anthony et al. 2006), data from one year can not be interpreted as a trend in occupancy and reproduction rates within the project area.

The amount and quality of habitat within the core areas and home ranges is highly variable. Existing habitat within eight of these estimated home ranges is below the level

(1,336 acres) at which NSO abundance is expected to decrease and productivity is anticipated to be impaired (Table 3). Additionally, eight of the core areas lack large amounts or contiguous blocks of nesting and roosting habitat. Low occupancy and reproductive rates observed over the last five years may be indicative of the amount and size of nesting habitat patches within core areas.

Critical habitat in the analysis area. On January 15, 1992, the USFWS designated 6.9 million acres of critical habitat for the NSO across Washington, Oregon, and California (USDI Fish and Wildlife Service 1992). Critical habitat for a listed species contains the physical or biological features (primary constituent elements) essential to the conservation of the species. The primary constituent elements identified in the NSO critical habitat final rule include those physical and biological features that support nesting, roosting, foraging, and dispersal (Ibid).

Northern spotted owl critical habitat was designated based on the identification of large blocks of suitable habitat that are well distributed across the range of the NSO. Critical habitat units were intended to identify a network of habitats that provided the functions considered important to maintaining stable, self-sustaining, and interconnected populations over the range of the spotted owl, with each CHU having a local, provincial, and a range-wide role in spotted owl conservation. Most CHUs were expected to provide suitable habitat for population support, some were designated primarily for connectivity, and others were designated to provide for both population support and connectivity.

The project area is located within two critical habitat units (CA-14 and OR-76). These units are contiguous (divided only by the Oregon and California state line) and encompass over 63,000 acres, of which, approximately 25,250 is suitable NSO habitat. Together these units provide important inter- and intra-provincial connectivity and are expected to support 20 pairs of NSOs over time (USDI Fish and Wildlife Service 1991). Based on survey data compiled from the KNF, private timber companies, the Rogue-Siskiyou National Forest and the Service from 2002-2006, it is estimated that between 12 and 14 pairs currently occupy these CHUs.

B. Effects of the Proposed Project on NSOs

The proposed project has the potential to affect the ability of NSOs to breed, feed, shelter, or disperse by removing and/or modifying habitat components required for these activities. Normal behavior patterns of NSOs may also be disrupted by actions that create smoke and noise above ambient levels. Treatment prescriptions and the protection measures described above will reduce the liklihood that habitat modification and smoke and noise disturbance will adversely affect NSOs.

Effects to NSO Habitat

Alternative 1 – No action

In the absence of large scale natural disturbance it is unlikely that the amount of NSO habitat in the project area will significantly change in the near future. Forest Vegetation Simulator (FVS) modeling indicates that 50 years from present stands will still be dense (greater than 340 trees and 285 square feet basal area/acre), and dominated by trees less than 12.5 inches in diameter at breast height (dbh). Density related mortality is expected to continue, with between 35 to 60 percent of the extant trees dying within that period. Thus, surface fuels are expected to dramatically increase over time. Additionally, in the event of a fire start, the Fire and Fuels Extension (FFE) of the FVS model indicates several general patterns regarding fire behavior and fire induced tree mortality over time including (1) a constant or increasing crown fire potential under both moderate and severe weather conditions, (2) an increase in surface fire intensity under both moderate and severe weather conditions, and (3) either a constantly high or increasing level of tree mortality and basal area reduction. Thus, the no action alternative increases the potential for wildfire to remove existing NSO habitat and impact recruitment of important habitat components such as large DWD for decades and does little to promote the development of such habitat.

Alternatives 2, 4, and 5 – Action Alternatives
The action alternatives would have similar effects to NSOs and will be discussed together except where specifically stated otherwise.

Thinning and Fuels Reduction
Thinning designed to promote the development of late-successional stands will not remove important structural components of nesting, roosting, or foraging habitat such as large diameter trees, snags, and DWD. A minimum of 60 percent canopy closure will be retained in existing nesting, roosting, or foraging habitat and 40 percent in dispersal habitat. Where existing stand conditions permit, > 200 ft^2 basal area/acre will be retained in nesting or roosting habitat and > 160 ft^2 basal area/acre will be retained in foraging habitat. Trees infected with mistletoe, which may provide nesting structure, may be removed. However, thinning prescriptions are designed to ensure that this habitat component will remain on the landscape, particularly on the lower half of north and east facing slopes where probability of nesting is greatest. Fuel reduction treatments (primarily underburning) have the potential to remove snags and DWD. However, underburn prescriptions are designed to imitate low intensity fire and where stand conditions permit retain Mount Ashland Late-Successional Reserve Assessment (MLSRA) recommendations for these components.

Thinning to create DFPZ's has the potential to impact NSO habitat by removing large-diameter trees (> 20"), snags, and DWD. To meet objectives for the Siskiyou Peak DFPZ under alternatives 2 and 4, approximately four acres of foraging habitat will be downgraded to dispersal habitat in stand 339. Stand 339 is a high elevation (6500 feet), ridgetop, true fir stand that is exhibiting a high level of mortality. Outside of stand 339, the removal of large diameter trees would only occur under very limited circumstances when it is necessary to meet stand density objectives or if a tree shows obvious signs of disease or poor vigor. Additionally, thinning in DFPZs will meet the canopy retention requirements for NSOs discussed above. Therefore, the number of large trees to be removed is expected to be minimal and would not change the function of any stands outside of stand 339 (i.e., stands that provide foraging habitat would continue to provide foraging habitat post harvest). Also, incorporating MLSRA recommendations for snags and DWD ensures that these components will be retained. The silvicultural prescriptions also ensure that the DFPZ's will not result in large canopy gaps.

By meeting MLSRA recommendations for snags and DWD, retaining adequate canopy closure within existing NSO habitat, and by limiting the removal of large diameter trees, thinning and fuels reduction activities will not remove any existing NSO nesting, roosting, or dispersal habitat. Additionally, the physiographic features associated with the four acres of foraging habitat to be downgraded indicate a low probability of use by foraging owls. Thus, impacts to NSO habitat from thinning and fuels reduction activities are expected to be minimal.

Over time, thinning and fuel reduction treatments are expected to have significant benefits to NSOs by increasing the amount and distribution of nesting, roosting, foraging and dispersal habitat and by reducing fuels to a level that would result in an acceptable fire behavior and post fire stand condition. FVS modeling indicates that 50 years post thinning the average tree diameter within a stand would increase to between 24 and 27" and 14 to 15 trees per acre greater than 30" would be expected. More large stems per acre would also increase recruitment of large snags and DWD, an important structural component of NSO habitat. Stands will also be less dense (averaging between 56 and 81 trees/acre) and will average between 216 and 257 square feet of basal area per acre. Stands exhibiting these structural elements are typically selected by NSOs for nesting, roosting, and foraging (Solis & Gutiérrez 1990; LaHaye & Gutiérrez 1999; North et al. 1999; Irwin et al. 2004). FFE modeling indicates that thinning and subsequent fuels treatment will generally reduce crown fire potential and maintain a surface fire type and significantly reduce predicted stand mortality in the event of a fire start. These factors indicate that stands will be more resistant to large scale fires but will burn with sufficient intensity to create small openings within forested habitat. This type of pattern would create a mosaic of stands in different successional stages and be consistent with patterns under historic fire regimes. This pattern of successional stages would likely benefit NSOs by creating horizontal diversity of habitat across the landscape.

<u>Temporary Road and Landing Construction</u>
No construction of temporary roads or landings is proposed in nesting or roosting habitat. Temporary road and landing construction is expected to remove between 2.5 and four acres of foraging habitat. At the project scale, this represents a 0.2 percent reduction in foraging habitat. To ensure that impacts to foraging habitat are minimized, all trees greater than 24" that need to be felled for a temporary road or landing will be left on site. Foraging habitat proposed to be removed occurs in small blocks (0.5 acre or less) and is dispersed across the project area. Therefore, it is expected that the proposed removal of foraging habitat is insignificant relative to the amount and distribution of foraging habitat across the project area.

Construction of temporary roads and landings will also remove between 19 and 35 acres of dispersal habitat. At the project scale, this represents an approximately 0.5 percent reduction in dispersal habitat. Patches of dispersal habitat proposed to be removed range from 0.5-2 acres. In general, impacts to dispersal habitat will be dispersed; however, more concentrated effects to dispersal habitat may occur in the upper portion of the Siskiyou Gap DFPZ, particularly under alternatives 2 and 4. However, due to the patch size and total acres of dispersal habitat to be removed, and the amount of existing dispersal habitat within the project area, the removal of 19-35 acres of dispersal habitat is not expected to create any dispersal barriers for NSOs in the project area.

Road- Related Activities
Road-related activities, including maintenance, closures, and decommissioning, is not expected to remove any important structural components of NSO habitat.

Summary: No nesting/roosting habitat will be removed or downgraded. Between 6.5 and eight acres of foraging habitat (less than 0.4 percent of existing foraging habitat in the project area) will be removed or downgraded. Additionally, 19-35 acres (approximately 0.5 percent of existing dispersal habitat in the project area) will be removed. In general, acres of foraging and dispersal habitat to be removed occur in small blocks and are distributed across the landscape. Thus, impacts to NSO habitat are expected to be minimal.

Effects to Prey: Thinning and fuel reduction treatments also have the potential to impact food and cover for some NSO prey species (Colgan et al.1999; Carey 2000) by removing snags and DWD. However, prescriptions are designed to meet MLSRA recommendations for these important components of NSO prey species habitat. Additionally, where thinning and fuel reduction treatments similar to those proposed in this project have been applied, effects to the abundance of NSO prey species and their forage have been shown to be insignificant or of short duration (Waters et al. 1994; Carey & Wilson 2001; Suzuki & Hayes 2003; Gomez et al. 2005).

To ensure the distribution of NSO prey will not be significantly impacted by fuel reduction treatments, project design features limit the amount of NSO habitat that can be included within proposed underburn perimeters annually to $\leq$ 35 percent of the suitable habitat within a NSO core area and $\leq$ 25 percent of the suitable habitat within a home range. However, the area within a fire perimeter that actually burns is highly variable (Sugihara et al. 2006). Unburned areas within the fire perimeter may act as refugia for some small mammals (Lyon et al. 2000). Underburn monitoring data collected by the KNF from 1998 to 2005, indicates that an average of 31 percent of the area within an underburn remains unburned post treatment (USDA Forest Service 2005a). Therefore, the actual number of acres burned within an NSO core area or home range is expected to be considerably lower than 35 and 25 percent, respectively. Thus, effects to NSO prey species distribution are expected to be minimal.

Effects to Individual NSOs and Historic Activity Centers: To ensure that no direct effects to NSOs will occur (actions that directly kill or injure owls) with project implementation, a seasonal restriction of February 1st to September 15th will apply to all activities that modify habitat (including activities that degrade or are beneficial) within 0.25 mile of an active nest site or unsurveyed suitable habitat.

Because NSOs are highly mobile, it is expected that adults foraging or dispersing across the landscape can easily avoid activities that create smoke or noise above ambient levels. However, juveniles that are not yet able to fly and adults that are closely defending a nest may be vulnerable to such activities. Therefore, a seasonal restriction of February 1st to July 9th and February 1st to July 31st will be applied to all activities that create noise above ambient levels and smoke within 0.25 mile of an active nest site or unsurveyed suitable habitat, respectively. Additionally, smoke will be managed so that it does not inundate occupied sites or unsurveyed suitable habitat.

No nesting/roosting habitat will be removed. Foraging habitat will be removed or downgraded from six NSO home ranges that currently contain limited amounts of habitat (KL1178, KL1180, KL1188, KL1189, KL1310, KL1311) (Table 3). However, only 0.2 to 0.5 acre of foraging habitat would be removed from any one NSO core area and between 0.5 and six acres would be removed or downgraded from any one NSOs home range. These acres represent <0.1 to approximately 1.1 percent of the extant suitable habitat within these NSO core areas and home ranges, respectively. Thus, the majority of impacts to foraging habitat would occur outside of the core area and breeding season home range of any NSO activity center. Additionally, it is unlikely that the four acres of foraging habitat to be downgraded in the home ranges of KL 1188 and KL 1189 (stand 339) provide quality foraging habitat due to the physiographic features associated with these acres. Therefore, because patches of foraging habitat to be removed are small, foraging habitat to be downgraded likely has low intrinsic value, impacts to foraging habitat are dispersed across the project area, and most of the foraging habitat to be removed occurs in the outer portion of any given home range, the removal and downgrading of foraging habitat is not expected to impact foraging opportunities for NSOs in the project area.

Case studies examining the foraging activity of spotted owls before and after thinning are limited. Meiman et al. (2003) reported that commercial thinning adjacent to an active NSO nest, resulted in the expansion of the males' home range and a shift in the core use area post harvest. However, the sample size in their study was one, and the authors note that drawing conclusions from a case study of one animal has limitations and that they were unable to apply their findings to spotted owls in general. In another experimental study conducted by Irwin et al. (2006; L. Irwin pers. comm. 2006), 10 to 20 percent of 16 spotted owl core areas were thinned or partially harvested. Following treatment some owls moved their site centers away from treated stands, while other owls shifted their activity centers closer to treated units. Additionally, no changes in home range sizes that could be attributed to the treatments were detected. The equivocal results of these studies make inferences to this project difficult. However, Irwin et al. (2006) noted that the size class of trees and the amount of basal area remaining post treatment influenced habitat used by foraging owls. Because thinning and fuel reduction prescriptions for the project are designed to retain stand conditions within the optimal range used by foraging owls (160 to 250 ft^2 basal area/ acre where existing stand conditions permit, largest trees retained) impacts to patterns of habitat use by NSOs are expected to be minimal and of short duration.

Effects to Populations and Trends: The project will not remove nesting/roosting habitat and will result in insignificant changes to the amount and distribution of foraging and dispersal habitat across the landscape. Therefore, the project will have no effect on the local or regional population trends of NSOs. By promoting the development of late-successional stands and the amount and distribution of NSO habitat, the project is expected to improve the ability of the project area to support a population cluster over time.

Effects on Existing Threats:

1. Habitat trends: The amount of foraging habitat to be removed is inconsequential with respect to current habitat trends for the NSO. By promoting the development of NSO habitat on approximately 2,000 to 2,500 acres, the project is expected to increase habitat over time.

2. Wildfire: FFE modeling indicates that the project area will be more resistant to uncharacteristic wildfire following thinning and fuels reduction treatments. Thus, proposed treatments will reduce the threat that uncharacteristic wildfire currently poses to existing NSO habitat. Additionally, FFE modeling indicates that in the event of a fire start, fire behavior would be more consistent with historic patterns following the proposed treatments.

3. Barred Owl: The effect of forest management on barred and spotted owl interactions has not been demonstrated. However, due to the limited impact to NSO habitat and their prey, it is unlikely that the proposed thinning and fuel reduction treatments will have an effect on influencing the likelihood or outcome of barred owl and NSO interactions.

Cumulative Effects

This cumulative effects analysis considers the effects to NSOs within the project area as well as the effects within the estimated 1.3 mile home range of NSOs that overlap with project treatments. The project area is predominately federal lands with small in-holdings of private ownership. Much of the project area is bounded by industrial timber lands. Prior to European settlement the majority of the Beaver Creek watershed, which includes the project area, was late-successional mixed conifer forest. During the railroad logging era (1910 – 1932) the project area was privately owned and was extensively harvested - an estimated 90 percent of the trees within the project area were removed. During this era, pine was the preferred species with the largest trees on the landscape being targeted for removal. Thus, at the conclusion of the railroad logging era NSO habitat in the project area was limited to higher elevation true fir stands and scattered pockets of mixed conifer at lower elevations. After acquiring much of the railroad logged area in land exchanges, the KNF conducted partial cuts during the 1950s – 1970s, further contributing to changes in distribution and abundance of NSO habitat. Similar to railroad logging, KNF partial cuts primarily targeted large trees but did not focus on pine. Timber harvest on private lands has also reduced the amount and distribution of suitable habitat within the NSO analysis area. For this analysis a new NSO habitat layer was created from 2005 digital orthophoto quads, field verification, and the KNF habitat layer.

Actions on private lands within the project area that occurred in 2005 were reviewed to identify activities that may have impacted NSO habitat after the photos were taken. All 2005 actions that impacted NSO habitat and were not captured by the photos and all 2006 activities were then used to revise the habitat baseline. Thus, the baseline acres of habitat discussed in this analysis include all past impacts to NSO habitat. See Table 4 for a list of private lands timber harvest that were used to revise the 2005 photos. Reasonably foreseeable future actions within the project area include small scale timber harvest on private lands. Within these areas, suitable habitat is limited and consists primarily of foraging habitat or dispersal quality habitat. Although proposed activities in these areas would not likely remove habitat, these activities would likely degrade existing habitat. Outside of the project area but within the estimated 1.3 mile home range of NSOs that overlap with project treatments there are two timber harvest plans (THP) expected to be implemented in the reasonably foreseeable future (Bumblebee, and Hungry Youth). The Bumblebee THP is expected to remove approximately 25–30 acres of foraging habitat from two NSO home ranges (4 acres from KL1167 and 25 acres from KL1267). Due to the extant amount of habitat in these home ranges this action is not expected to have a significant impact to NSOs. Approximately 400 acres of the Hungry Youth THP overlaps with the NSO analysis area. These acres contain roughly equal amounts of foraging and dispersal habitat. Although silvicultural prescriptions for the Hungry Youth THP have not yet been finalized, it is expected that approximately 25 percent of the THP will be in clearcut patches (Doug Staley pers. comm. 2006). Thus it is reasonable to conclude that the Hungry Youth THP would remove up to 50 acres of foraging habitat from the home range of KL1169 and up to 5 acres from the home range of KL1176. A similar amount of dispersal habitat would also be expected to be removed from these home ranges. Due to the existing amount of habitat in these home ranges these impacts are not expected to be significant. Other planned projects or activities expected to occur on federal land within the Project area include ongoing pre-commercial thinning in existing plantations, grazing, and dispersed recreation. These activities are not expected to impact NSO habitat. See Table 5 for a list of reasonably foreseeable future actions used for this cumulative effects analysis.

Cumulatively, the project may impact NSOs by removing or downgrading between 61 and 63 acres of foraging habitat and 74 to 90 acres of dispersal habitat from 10 home ranges (Table 6). However, the majority of foraging habitat to be removed occurs outside of NSO core areas and in home ranges that will retain adequate amounts of suitable habitat post harvest, has low intrinsic value, or occurs in small patches. Additionally, the cumulative acres of habitat removed or downgraded represent 0.8 and 1.3 percent of extant foraging and dispersal habitat in the NSO analysis area, respectively. Due to the limited impacts to habitat, the cumulative effects are not expected to significantly increase the cumulative effects to NSOs.

Effects to LSR:
The NWFP represents the primary conservation strategy for the NSO. Because LSRs are a key component of the NWFP, effects of the project on the LSR network will be evaluated in this analysis.

Effects of the proposed alternatives

Alternative 1 – No action

Under the no action alternative late-successional habitat would be slow in developing and the potential fire behavior in the project area would remain unacceptable relative to LSR objectives. FVS modeling indicates that 50 years from present, stands will still be dense, averaging greater than 340 trees and 285 square feet basal area/acre, and dominated by trees less than 12.5 inches dbh. An average of seven to nine trees per acre greater than 30" would be expected. Density-related mortality is expected to continue, with between 35 to 60 percent of the extant trees dying within that period. Mortality is expected to be greatest in the smaller size class trees but large trees that are in a weakened condition will also be affected. Thus, surface fuels are expected to dramatically increase over time. Additionally, in the event of a fire start, the Fire Fuels Extension (FFE) of the FVS model indicates several general patterns regarding fire behavior and fire induced tree mortality over time including (1) a constant or increasing crown fire potential under both moderate and severe weather conditions, (2) an increase in surface fire intensity under both moderate and severe weather conditions, and (3) either a constantly high or increasing level of tree mortality and basal area reduction. Thus, the no action alternative increases the potential for fire to remove the desired structural components of a LSR and does little to promote and maintain a functional, interactive, late-successional and old-growth forest ecosystem.

Alternatives 2, 4, and 5 – Action Alternatives

The action alternatives would have similar effects to LSR function and will be discussed together except where specifically stated otherwise.

Thinning and Fuels Reduction

Thinning designed to promote the development of late-successional habitat will not remove important structural components of LSRs such as large diameter trees, snags and DWD. Trees infected with mistletoe may be removed, but silvicultural prescriptions have been designed to ensure that this structural component will remain on the landscape. Thinning to create DFPZ's and fuels reduction treatments may remove large diameter trees (> 20"), snags, and DWD. However, as the removal of large diameter trees would only occur under limited circumstances, the number of large trees to be removed is expected to be minimal. Additionally, silvicultural prescriptions are designed so that the creation of DFPZs will not result in large gaps in the canopy and the incorporation of MLSRA recommendations for snags and DWD will ensure that these components are also retained. Therefore, only 4 acres of late-successional forest is expected to be degraded in DFPZs under alternatives 2 and 4.

Fuel reduction treatments (primarily underburning) have the potential to remove snags and DWD. However, fuel reduction prescriptions are designed to imitate low intensity fire and retain MLSRA recommendations for these components.

Over time, thinning and fuel reduction treatments are expected to enhance the function of the LSR by increasing the amount, distribution, and diversity of late-successional habitat and by reducing fuels to a level that would result in an acceptable fire behavior and post fire stand condition. FVS modeling indicates that 50 years post thinning stands will be less dense (averaging between 56 and 81 trees/acre) and will increase in basal area. Average tree diameter would increase to between 24 and 27" and 14 to 15 trees per acre greater than 30" would be expected. An increase in the amount of large diameter trees also improves the recruitment of large snags and DWD. FFE modeling indicates that thinning and subsequent fuels treatment will generally reduce crown fire potential or maintain a surface fire type and significantly reduce predicted stand mortality in the event of a fire start. These factors indicate that stands will be more resistant to large scale fires but will burn with sufficient intensity to create small openings within forested habitat.

Temporary Road and Landing Construction

Construction of temporary roads and landings has the potential to remove large-diameter trees, snags, and DWD and fragment existing late-successional stands. To the extent possible, temporary spurs have been routed to minimize impacts to large diameter trees and late-successional stands. Approximately 0.2 to 0.4 mile of temporary spur road is proposed through existing late-successional stands. Thus, approximately 1.1 acres of late-successional forest will be removed or degraded. Late-successional stands proposed to be entered include an open-canopy ridge-top stand and a closed-canopy mixed conifer stand. These stands range in size from approximately 4 to 35 acres with the intervening forest consisting of predominately early- and mid-successional stands with scattered patches of late-successional stands. A sample inventory of stands within the project area indicated that DWD greater than 24 inches is limited (T. Laurent, pers. comm. 2006). Therefore, because large DWD is an important component of LSRs, all trees greater than 24" that need to be felled for a temporary road will be left on site. By removing mid-successional habitat the construction of temporary spurs also has the potential to increase fragmentation of future late-successional stands preventing that piece of ground from developing into late-successional habitat in at least the near term. Due to their distribution and the linear nature of roads, the effects of these actions are generally dispersed across the project area; however, more concentrated effects may occur in the upper portion of the Siskiyou Gap DFPZ under alternatives 2 and 4. However, at the scale of the LSR this level of potential fragmentation is expected to be insignificant relative to the ability of the LSR to provide a functional, interactive, late-successional and old-growth forest ecosystem.

By routing temporary roads through non-late-successional stands wherever possible, routing temporary roads to minimize the felling of large diameter trees, and because temporary roads are desgined to facilitate activities that promote the development of and protection of existing late-successional stands, the proposed temporay road construction is consistent with NWFP S&Gs for late-successional reserves (USDA Forest Service & USDI Bureau of Land Management 1994a, pg C-16).

No landings are proposed in existing late-successional habitat.

Road Related Activities

Road related activities, including maintenance, closures, and decommissioning is not expected to remove any important structural components of the LSR.

Summary: Approximately 1.1 acres of late-successional forest will be removed during temporary road construction and 4 acres degraded during thinning to create DFPZs. However, at the scale of the LSR the acres to be removed are insignificant relative to LSR function. Additionally, thinning and fuels reduction treatments are designed to minimize the removal of large diameter trees, retain adequate canopy cover in existing NSO habitat, and retain MLSRA recommendations for snags and DWD. Thus, the project is not expected to impact connectivity of late-successional forest or the ability of this LSR to provide a functional, interactive, late-successional and old-growth forest.

Effects to NSO Critical Habitat:

Effects of the proposed alternatives

Alternative 1 – No action

Under the no action alternative the primary constituent elements of critical habitat would be slow in developing and the potential fire behavior in the project area would remain unacceptable relative to critical habitat objectives. FVS modeling indicates that 50 years from present stands will still be dense (greater than 340 trees and 285 square feet basal area/acre), and dominated by trees less than 12.5 inches dbh. Stands of this structure typically do not provide the habitat components commonly associated with NSO nesting, roosting, or foraging habitat (Solis & Gutiérrez 1990; LaHaye & Gutiérrez 1999; North et al. 1999; Irwin et al. 2004). Density-related mortality is expected to continue, with between 35 to 60 percent of the extant trees dying within that period. Thus, surface fuels are expected to dramatically increase over time. Additionally, in the event of a fire start, FFE modeling indicates several general patterns regarding fire behavior and fire induced tree mortality over time including (1) a constant or increasing crown fire potential under both moderate and severe weather conditions, (2) an increase in surface fire intensity under both moderate and severe weather conditions, and (3) either a constantly high or increasing level of tree mortality and basal area reduction. Thus, the no action alternative increases the potential for fire to remove the existing physical and biological features important to functioning critical habitat and does little to promote the development of such characteristics.

Alternatives 2, 4, and 5 – Action Alternatives

The action alternatives would have similar effects to critical habitat function and will be discussed together except where specifically stated otherwise.

Thinning and Fuels Reduction

Thinning designed to promote the development of late-successional stands and the primary constituent elements of NSO critical habitat will not remove important structural components of nesting, roosting, or foraging habitat such as large diameter trees, snags and DWD. A minimum of 60 percent canopy closure will be retained in existing nesting, roosting, or foraging habitat and 40 percent in dispersal habitat. Trees infected with mistletoe may be removed, but silvicultural prescriptions have been designed to ensure that this component will remain on the landscape. Fuel reduction treatments have the potential to remove DWD but prescriptions are designed to retain MLSRA recommendations for this habitat component.

Thinning to create DFPZ's has the potential to impact NSO critical habitat by removing large diameter trees (> 20"), snags, and DWD. To meet objectives for the Siskiyou Peak DFPZ under alternatives 2 and 4, approximately four acres of foraging habitat will be downgraded to dispersal habitat in stand 339. However, due to the physiographic features associated with these acres, it is likely that they do not provide significant foraging opportunities for NSOs. Outside of stand 339, the removal of large diameter trees would only occur under very limited circumstances when it is necessary to meet stand density objectives or if a tree shows obvious signs of disease or poor vigor. Therefore, the number of large trees to be removed is expected to be minimal. Additionally, where stand conditions permit, MLSRA recommendations for snags and DWD will be retained. The silvicultural prescriptions also ensure that the DFPZ's will not result in large canopy gaps. Although some structural components of critical habitat may be reduced with the above actions, when assessed at the stand scale, effects are not expected to change the function of NSO habitat (i.e., stands providing foraging habitat will remain foraging quality post treatment).

Over time, thinning and fuel reduction treatments are expected to enhance the function of CHUs CA-14 and OR-76 by increasing the amount and distribution of nesting, roosting, foraging and dispersal habitat and by reducing fuels to a level that would result in an acceptable fire behavior and post fire stand condition. FVS modeling indicates that 50 years post thinning the average tree diameter within a stand would increase to between 24 and 27" and 14 to 15 trees per acre greater than 30" would be expected. Stands with this type of structure are more typical of stands associated with NSO nesting and roosting habitat (Solis & Gutiérrez 1990; LaHaye & Gutiérrez 1999). More large stems per acre would also increase recruitment of large snags and DWD. Stands will also be less dense (averaging between 56 and 81 trees/acre) and will average between 216 and 257 square feet of basal area per acre. These basal area values are within the optimal range for spotted owl foraging habitat as reported by Irwin et al. (2004). FFE modeling indicates that thinning and subsequent fuels treatment will generally reduce crown fire potential or maintain a surface fire type and significantly reduce predicted stand mortality in the event of a fire start. These factors indicate that stands will be more resistant to large-scale fires but will burn with sufficient intensity to create small openings within forested habitat. This type of pattern, which would create a mosaic of stands in different successional stages, would be consistent with patterns under historic fire regimes. Over time, this pattern would likely enhance critical habitat function by providing horizontal diversity of habitat across the landscape.

<u>Temporary Road and Landing Construction</u>
No temporary road or landing construction is proposed in nesting or roosting habitat. Construction of temporary roads and landings is expected to remove small patches (0.5 acre or less) of foraging habitat totaling between 2.5 and four acres and 19 to 35 acres of dispersal habitat in 0.5 to two acre patches. These acres represent approximately 0.1 to 0.2 percent and 0.3 to 0.6 percent of extant foraging and dispersal habitat in the project

area, respectively. To ensure that impacts to the primary constituent elements of critical habitat are minimized, all trees greater than 24" that need to be felled for a temporary road or landing will be left on site. Because patches of foraging habitat to be removed are small, impacts to foraging habitat are dispersed across the project area, and the total acres of foraging habitat to be removed is minimal, these actions are not expected to impact the ability of CA-14 and OR-76 to provide foraging opportunities for NSOs. Due to temporary road construction, more concentrated impacts to dispersal habitat may occur in the upper portion of the Siskiyou Gap DFPZ, particularly under alternatives 2 and 4. However, due to the existing amount of dispersal habitat within the project area, total acres of dispersal habitat to be removed, and the linear nature of the effects resulting from temporary spur construction, the dispersal function of CA-14 and OR-76 is not expected to be affected.

Road-Related Activities
Road-related activities, including maintenance, closures, and decommissioning is not expected to remove any important structural components of critical habitat.

Summary: Impacts to the primary constituent elements of critical habitat include the removal or downgrading of between 6.5 and eight acres of foraging habitat and between 19-35 acres of dispersal habitat. Foraging habitat to be removed or downgraded generally occurs in small blocks, is distributed across the landscape, or is assumed to be of low intrinsic value. Dispersal habitat to be removed represents less than one percent of existing dispersal habitat in the project area and is not expected to create barriers to dispersing NSOs. Although fuel reduction treatments and thinning to creat DFPZs may remove discrete components of critical habitat from other stands, retention of adequate canopy closure in suitable NSO habitat and MLSRA recommendations for snags and DWD ensure that existing function will be retained. Thus, impacts to the primary constituent elements of foraging and dispersal are expected to be minimal.

Cumulative Effects
According to USDA Forest Service and USDI Bureau of Land Management (1994a), there were 23,116 acres of suitable NSO habitat within CA-14 and OR-76 in 1994. Since that time only 74 acres of habitat has been removed (USDA Forest Service 2005b). Reasonably foreseeable actions in CA-14 and OR-76 south of the Siskiyou Crest include three KNF projects; Tennis Thin, Colestine, and other plantation thinning projects. The Tennis Thin project includes commercial thinning and fuels reduction in overstocked mixed conifer stands and the Colestine project includes commercial thinning in pine plantations. Grazing, recreation, and pre-commercial thinning in plantations will also continue throughout the project area. None of these projects will remove suitable NSO habitat. North of the Siskiyou Crest reasonably foreseeable future actions include the Ashland Watershed Protection Project, the Mt. Ashland Ski Area Expansion, and the Ashland Forest Reliency Project. The Ashland Watershed Protection Project will remove approximately 18 acres of suitable NSO habitat while the Mt. Ashland Ski Area Expansion will remove 44 acres. The Ashland Forest Resiliency Project is designed to restore more fire resilient forests in the Ashland watershed by implementing several types of hazardous fuel treatments. Approximately 1,000 acres of suitable NSO habitat will be

removed or downgraded (nesting, roosting, and foraging habitat converted to dispersal habitat post treatment) with the implementation of that project. There are no other actions proposed in these CHUs.

Cumulatively, the project will impact CA-14 and OR-76 by removing or downgrading between 6.5 and eight acres of foraging habitat and 19 to 35 acres of dispersal habitat. Due to the limited impacts to the primary constituent elements, the action alternatives will not significantly increase the cumulative effects to these CHUs.

C. Determination of Effects on NSO and NSO Critical Habitat

The following factors were considered in making the determination of the effects for NSOs and NSO critical habitat:

- No nesting or roosting habitat will be removed or downgraded.
- Less than 0.4 percent of existing foraging habitat within the project area will be removed or downgraded.
- Less than 1.0 percent of the existing dispersal habitat within the project area will be removed.
- No more than one acre of foraging habitat will be removed from any one NSO core area.
- The majority of foraging habitat to be removed occurs in the outer portion of estimated NSO home ranges, outside of the estimated breeding season home range.
- Effects to NSO prey species are expected to be minimal or of short duration.
- Project design features minimize the likelihood that NSOs will be killed or injured during project implementation or that normal breeding behaviors will be disrupted by noise or smoke.
- Impacts to the primary constituent elements of critical habitat are expected to be minimal and will not affect the nesting, roosting, foraging, and dispersal function of CA-14 and OR-76.

Based on the above factors it is my determination that the proposed project **may affect, and is not likely to adversely affect** NSOs and NSO critical habitat.

2) **Bald Eagle**

Environmental Baseline

The bald eagle was originally listed as Endangered because of a severe decline in numbers observed from the 1940s through the 1960s. This decline was primarily attributed to the use of certain organochlorine pesticides, which caused reproductive dysfunction and eggshell thinning, and habitat loss (USDI Fish and Wildlife Service 1995). Eagle populations have rebounded since the banning of DDT and the increased protection for nesting and winter roosting habitat. Bald eagles have been downlisted to Threatened as a result of increased populations and are currently under review for removal from the endangered species list.

Bald eagles forage on a variety of foods based on prey species availability, with birds, fish, and mammals being the most common prey items (Swenson et al. 1986; Stalmaster 1989; Buehler 2000). Carrion is also an important food source especially during winter (Swenson et al. 1986; Buehler 2000). Nest sites typically occur in forests with old growth components such as very large open-limbed trees (Buehler 2000), and nest sites are usually within a mile of a large body of water (Lehman 1979; Swenson et al. 1986; Anthony & Isaacs 1989). Roost sites are associated with foraging areas but are not necessarily as close to water as nest sites (Buehler 2000). Throughout the species' range roost sites are typically in super-canopy trees (Keister & Anthony 1983; Chester et al. 1990; Buehler et al. 1991).

Bald eagles are known to roost and forage in the vicinity of the Beaver Creek and Klamath River confluence, approximately seven miles south of the project area. The nearest known nest site is on the Klamath River, more than nine miles southwest of the project area. There are no large rivers, lakes, or other bodies of water suitable for bald eagles within the action area.

Effects of the proposed alternatives
There are no known nest sites, roost sites, rivers, or large bodies of water suitable for bald eagle foraging in the project area. Although large, mature trees suitable for nesting and roosting exist in the project area, their distance from the lower Beaver Creek and Klamath River likely precludes their use. Thus, the proposed alternatives will have no effect on bald eagles.

Cumulative Effects
The proposed project will have no effect on bald eagles; thus there will be no cumulative effects resulting from the proposed alternatives.

Determination
The project will have **"no effect"** on bald eagles.

FOREST SERVICE REGION FIVE SENSITIVE SPECIES

1) **Peregrine Falcon (Falco peregrinus)**
Environmental Baseline
Peregrine falcons are listed as a FS Region 5 Sensitive Species due to severe population declines resulting from the use of certain pesticides which caused reproductive dysfunction and eggshell thinning. Over the past 20-plus years, the population has rebounded and the bird was removed from the endangered species list in 1999.

Presently, there are 15 active peregrine falcon nesting territories being managed on the KNF. The peregrine falcon nesting territory nearest the project area (Indian Scotty eyrie) is approximately 30 miles to the southeast.

The presence of prominent cliffs is the most common habitat characteristic of peregrine nesting territories. Prominent cliffs function as both nesting and perching sites, and provide unobstructed views of the surrounding landscape. Nest site suitability requires the presence of ledges that are essentially inaccessible to mammalian predators, that provide protection from the elements, and that are dry (Johnsgard 1990). A source of water, such as a river, lake, marsh, or marine waters, is typically in close proximity to the nest site and likely is associated with an adequate prey base of small to medium-sized birds (Ibid).

Foraging areas include wooded areas, riparian areas, open grasslands, shrubby areas, and along rivers. Peregrines feed primarily on avian prey (White et al. 2002) and have been recorded foraging as far as 26 miles from nesting areas (Enderson & Craig 1997).

Field review by USFWS personnel determined that there are no large rocky cliffs or outcrops suitable for peregrine falcon nest sites within the project area.

Effects of the proposed alternatives
There are no known peregrine eyries in proximity to the project area and there is no suitable habitat for peregrine nesting. The proposed alternatives will have no effect on peregrine falcons.

Cumulative Effects
The proposed alternatives will have no effect on peregrine falcons; therefore, there will be no cumulative effects from the proposed alternatives combined with other actions in the analysis area.

D. Determination
The project will have **"no effect"** on peregrine falcons.

2) **Northern Goshawks**
Environmental Baseline
Goshawks are listed as a FS Region 5 Sensitive Species due to the loss of mature conifer forest habitat in the western United States. The Forest Ecosystem Management Assessment Team (FEMAT) (Thomas & Raphael 1993) analysis of the NWFP gave the goshawk a 100 percent chance of remaining well distributed throughout the northwest under the implementation of management option 9.

Goshawks inhabit a wide variety of forest habitats, including true fir (red fir, white fir, subalpine fir), mixed conifer, lodgepole pine, ponderosa pine, Jeffrey pine, montane riparian deciduous forest, and Douglas-fir (USDI Fish and Wildlife Service 1998). Goshawk nest sites tend to be associated with patches of relatively larger, denser forest than the surrounding landscape; however, home ranges often consist of a wide range of forest age classes and conditions (Ibid).

In the Pacific coastal states, Goshawks typically nest in conifers (Hargis et al. 1994; Bull & Hohmann 1994; McGrath et al. 2003). Numerous habitat studies and modeling efforts have found nest sites to be associated with similar factors including proximity to water or meadow habitat, forest openings, level terrain or 'benches' of gentle slope, northerly aspects, and patches of larger, denser trees, but these factors vary widely (USDI Fish and

Wildlife Service 1998). Goshawks are sensitive to noise disturbances during nesting and often exhibit defensive territoriality behavior around nest sites when disturbed (Squires & Reynolds 1997).

Results of radio telemetry studies on goshawks in California, and elsewhere in the west, suggest that foraging goshawks avoid dense young forest stands, brush, and clearcuts, but use a wide variety of stand conditions, showing some preference for relatively mature stands with moderate canopy closure (Austin 1993; Hargis et al. 1994; Beier & Drennan 1997; Bloxton 2002; Drennan & Beier 2003). Goshawks feed primarily on small mammals and birds. In California, Douglas squirrels (*Tamiasciurus douglasi*) are a key prey species (Keene et al. 2006). Prey is caught in air, on ground, or in vegetation, using fast, searching flight or rapid dash from a perch (Squires & Reynolds 1997).

Despite the fact that goshawks have been widely studied, very little is know regarding goshawk habitat use in the interior mixed conifer forests of the Klamath Province (B. Woodbridge pers. comm. 2006).

Within the project area, there exists approximately 2,700 acres of suitable nesting and foraging habitat for goshawks. Because habitat used by goshawks on the westside of the KNF appears to be similar to that used by NSOs, NSO habitat is a proxy for goshawk habitat. Due primarily to the lack of mature, late successional habitat and the overstocked character of many of the mid-successional stands, existing habitat is patchy, and/or of low quality.

The effects of drought and years of fire exclusion have put goshawk habitat within the project area at risk of uncharacteristically severe wildfire. Because goshawk habitat is already limited, wildfires that remove habitat could significantly impact the ability of goshawks to occupy or re-colonize this area.

There are nine historic goshawk territories on the Oak Knoll Ranger District with only one (Flystain Creek) occurring within the project area. An active nest was first discovered at the Flystain creek site in 1994. Since that time, protocol surveys have not been conducted in the area of this nest site. Because goshawks exhibit high territory fidelity (Reynolds & Joy 2006; B. Woodbridge, pers. comm. 2006), it is assumed that this territory is still occupied.

Surveys were conducted in 2005 and 2006 in the areas of highest quality habitat outside of the historic Flystain Creek territory with no detections. Additionally, no goshawks were detected during project field reviews or during NSO surveys (D. Johnson pers. obs.).

Effects of the proposed alternatives

Alternative 1 – No action

In the absence of large-scale natural disturbance it is unlikely that the amount of goshawk habitat in the project area will significantly change in the near future. FVS modeling indicates that goshawk habitat will be slow in developing. FFE modeling also indicates that fire behavior is expected to change over time, increasing the potential to remove existing and future goshawk habitat in the event of a fire start within the project area. Thus, the no action alternative does little to promote the development of goshawk habitat and increases the potential for wildfire to remove habitat over time.

Alternatives 2, 4, and 5 – Action Alternatives
The action alternatives would have similar effects to goshawks and will be discussed together.

Current management direction for northern goshawks on the KNF is provided by the KLRMP in the form of S&Gs. These S&Gs call for establishing a primary nest zone (0.5 mile radius) and a foraging habitat zone (1 mile radius) around all known goshawk nest sites. Approximately 300 acres of mature conifer forest should be maintained within the primary nest zone, and 900 acres of mid-mature and mature forest in the foraging zone. In addition, seasonal restrictions are required for habitat modification within 0.5 mile of known sites and for activities that create noise above ambient levels within 0.25 mile of known sites. Although between four and eight acres of goshawk habitat will be removed, by applying the above S&G's to the historic Flystain Creek site and to any new sites discovered during the life of this project, the proposed alternatives will have no effect to northern goshawks.

By reducing the density in overstocked stands, thinning would likely improve foraging opportunities in the near term. Nesting opportunities are also expected to improve over the long term as thinned stands develop late-successional characteristics. FFE modeling also indicates that the proposed thinning and fuel treatments would change expected fire behavior over time, resulting in fires of less intensity, thus, reducing the potential that existing and future goshawk habitat will be removed.

Cumulative Effects
The proposed alternatives will have no effect on northern goshawks; therefore there will be no cumulative effects from the proposed alternatives combined with other actions in the analysis area.

Determination
The project will have **"no effect"** on northern goshawks.

3) **Great Gray Owl**
Environmental Baseline
Great gray owls (GGOs) are listed as a FS Region 5 Sensitive Species due to loss of mature conifer forest habitat in the western United States. FEMATs analysis of the NWFP gave the GGO an 83 percent chance of remaining well distributed throughout the northwest.

GGOs typically nest in mature or old growth coniferous or mixed forests (Bull & Henjum 1990) but hardwood woodlands may also be used (Fetz et al. 2003). Nest sites tend to be adjacent to openings that have sufficient prey (Goggans & Platt 1992) and typically occur in forested stands with canopy closure exceeding 60 percent (Bull & Henjum 1990), although local variation of canopy closure at nest sites can occur (D. Johnson pers. ob. 2005). GGOs do not build their own nests but use existing platforms such as depressions on broken-topped snags, dwarf mistletoe brooms, or old raptor or corvid nests (Bull & Henjum 1990). Owlets leave the nest before they are able to fly relying on their wings, bill, and talons to climb tree trunks and leaning trees (Bull & Henjum 1990). At approximately two weeks owlets are able to fly (Ibid).

Throughout the GGO's range, foraging habitat typically consists of open, grassy habitat; natural meadows; open forests; and selective and clear cut forests (Forsman & Bryan 1987; Bull & Henjum 1990; Johnsgard 1988; Goggans & Platt 1992). GGO prey species consist mainly of small mammals, especially rodents. Voles and pocket gophers are primary prey species with shrews, moles, mice, flying squirrels, and chipmunks also consumed (Bull & Henjum 1990; Duncan & Hayward 1994; Fetz et al. 2003).

GGO home range size is highly variable (1–25 square miles) and is likely dependent upon on food supply and environmental condition such as snow depth (Bull & Henjum 1990).

Population trends for GGOs are uncertain due to limited long term survey data (Duncan & Hayward 1994) and difficultly in detection (S. Godwin pers. comm. 2005). Most commonly seen in wet meadows of the Sierra Nevada and the Cascades, vagrant individuals have also been recorded in northwestern California and the Warner Mountains (McCaskie et. al. 1988). The KNF is on the edge of the known range of the species and is not included in the range as described in Bull and Duncan (1993). However, according to USDA Forest Service and USDI Bureau of land Management (2004), GGOs have been observed in the California Klamath and California Cascades Physiographic Provinces, although breeding has not been confirmed in those areas.

Surveys were conducted by biologists from the Rogue River-Siskiyou National Forest on the Siskiyou Crest in the vicinity of Mt. Ashland, with no owls detected (D.Clayton, pers. comm. 2005). Although surveys did not find GGOs in the vicinity of the project area, GGOs are difficult to detect and negative surveys do not necessarily mean owls are not present; owls may be rare in the area and/or were not detected during the survey effort (S.Godwin, pers. comm. 2005). Additionally, not all potential GGO habitat in the project area was covered by these surveys. An incidental sighting of a GGO occurred in the vicinity of the Siskiyou Crest near Mt. Ashland in 2005 (C.Oakley, pers. comm. 2005), but the territorial status of that owl is not known. The closest confirmed GGO nest sites to the project occur approximately 8 miles to the west in the Applegate River drainage, and 14 miles to the northeast on the Dead Indian Plateau of southern Oregon (S. Godwin pers. comm. 2005).

GGO habitat within the project area consists of high elevation, mature true fir stands with open to moderately closed canopies. Many of these stands contain nesting platforms in the form of broken-topped trees or snags and are adjacent to naturally occuring meadows exhibiting pocket gopher and vole mounds and tunnels (D. Johnson, pers. obs. 2005). Approximately 300 acres of potential forested habitat adjacent to meadows occurs within the project area.

Effects of the proposed alternatives
Alternative 1 – No action
In the absence of large scale natural disturbance it is unlikely that the amount of GGO habitat in the project area will significantly change in the near future. However, FFE modeling indicates that in the event of a fire, crown fire potential and expected tree mortality will increase over time. Nesting structure will likely continue to be recruited as winter storms in the higher elevation fir stands create broken-topped trees and snags. Foraging habitat may decline in the absence of fire as conifer encroachment will continue to reduce the size and total acreage of natural meadows.

Alternatives 2, 4, and 5 – Action Alternatives
The action alternatives would have similar effects to GGOs and will be discussed together.

<u>Thinning and Fuels Reduction</u>
Thinning and fuels reduction treatments are proposed in approximately 30-45 acres of potential GGO nesting and foraging habitat. Thinning may remove individual trees that contain nesting structure. However, where existing conditions permit 3 snags greater than 25" dbh and 4-5 snags greater than 15" dbh will be retained per acre. Additionally, average canopy closure will be $\geq$ 60 percent after thinning. Thus, no nesting habitat is expected to be removed. By reducing stem densities in overstocked stands and reducing ladder fuels and ground cover, habitat for many GGO prey species including gophers, voles, and mice may be improved. Additionally, because GGOs prefer to forage in more open forested stands, thinning of overstocked stands may increase the amount of foraging habitat accessible to GGOs.

Although adult GGOs are highly mobile, nestlings and recently fledged owlets that are unable to fly may be susceptible to injury or mortality from thinning and fuels reduction activities during the nesting season (April through July). To avoid the possibility of injuring or killing nestlings or recently fledged owlets or disturbing adults during the breeding season, a seasonal restriction of March 1st to July 31st will apply to all thinning and fuels reduction activities that are proposed within 0.25 mile of GGO habitat.

Because no suitable habitat for GGOs will be removed, seasonal restrictions to protect nestlings and owlets and breeding activities of adults will be implemented, retention of MLSRA recommendations for large snags will ensure that nesting structure is retained, and the limited number of acres of suitable habitat to be entered, thinning and fuels reduction treatments will have no effect to GGOs.

<u>Temporary Road and Landing Construction</u>
No temporary road or landing construction is proposed in GGO habitat.

<u>Road Related Activities</u>
Road related activities will not impact GGO habitat.

Cumulative Effects
The project will have no effect on GGOs; therefore there will be no cumulative effects from the proposed alternatives combined with other actions in the analysis area.

Determination
The project will have **"no effect"** on GGOs.

4) **Willow Flycatcher**
Environmental Baseline
Willow flycatchers are listed as a FS Region 5 Sensitive Species due to the loss and degradation of riparian shrub habitats throughout its range, cowbird nest parasitism, and livestock grazing.

The willow flycatcher is a rare to locally uncommon summer resident in wet meadow and montane riparian habitats at 2000–8000 feet in the Sierra Nevada and Cascade Range. In California, this species most often occurs in broad, open river valleys or large mountain meadows with lush, high-foliage volume willows (Harris et al. 1987; CDFG 2006). Across its range, willow flycatchers typically select willow for nesting but may use other species of shrubs (Sedgwick 2000).

Willow flycatchers have been captured at the MAPS (Monitoring Avian Productivity and Survivorship) banding station in large willow thickets at Seiad Valley along the Klamath River over the past eleven years (S. Cuenca, pers. comm. 2006). This mist-netting station is approximately 19 miles from the project. Both adults and young of the year juveniles have been captured, indicating the species breeds in the Siskiyou Mountains. Willow flcatchers have also been detected during songbird surveys in the southern portion of the Mount Ashland LSR (S.Cuenca, pers. comm. 2006).

Within the project area, suitable habitat for willow flycatchers consists of small (typically less than 1 acre in size), isolated patches of willow and/or alder. These patches of habitat are located within riparian reserves and are scattered throughout the project area.

Effects of the proposed alternatives
Alternative 1 – No action
In the absence of large scale natural disturbance it is unlikely that the amount of willow flycatcher habitat in the project area will significantly change in the near future. However, FFE modeling indicates that in the event of a fire, fire would burn through many riparian areas, potentially removing shrub habitat.

Alternatives 2, 4, and 5 – Action Alternatives
The action alternatives would have similar effects to willow flycatchers and will be discussed together.

<u>Thinning and Fuels Reduction</u>
Thinning and fuel reduction treatments may occur within suitable willow flycatcher habitat. However, where thinning is proposed in willow flycatcher habitat, prescriptions are limited to pre-commercial thinning of existing conifers and hand-piling of fuels.

Thus, no suitable nesting habitat will be removed and no heavy machinery that has the potential to disturb habitat will be employed. Although prescribed fire will not be ignited within riparian reserves, underburns will be allowed to back into them. Thus, up to approximately 15 acres of willow flycatcher habitat may be underburned. Potential impacts include the removal of habitat or if underburning occurs in the spring, disturbing normal breeding activities.

Temporary Road and Landing Construction
No temporary road or landing construction is proposed in suitable willow flycatcher habitat.

Road Related Activities
Road decommissioning may impact small, discrete patches of habitat.

Cumulative Effects
Little is known about the hardwood/shrub composition and overall riparian reserve condition in the project area prior to Euro-American settlement. However, it is reasonable to conclude that activities such as mining, grazing, road construction, and to a lesser extent timber harvest, have all led to a considerable reduction in willow flycatcher habitat. The project area is predominately federal lands with small in-holdings of private ownership. KLRMP S&Gs ensure that actions on federal lands within the project area will have minimal impacts to riparian reserve habitat. However, ongoing grazing throughout the project area will likely continue to have adverse impacts to willow flycatcher habitat. Other projects or activities expected to occur within the project area include ongoing pre-commercial thinning in existing plantations and dispersed recreation. These actions are not expected to impact willow flycatcher habitat.

Determination
Because fuel reduction treatments and road decommissioning may remove habitat or disrupt breeding activities, the project **"may impact individuals, but is not likely to result in a trend toward federal listing or a loss of viability"** for willow flycatcher.

5) **Wolverine**
Environmental Baseline
Wolverines are listed as a FS Region 5 Sensitive Species due primarily to natural low population densities that have been impacted by trapping, human disturbances (roads, logging), and overgrazing in high mountain meadows.

Across their range wolverines are restricted to boreal forests, tundra, and western mountains (Banci 1994). Wolverines will roam through a variety of vegetative types including Douglas-fir, red fir, lodgepole pine, mixed conifer, subalpine conifer, dwarf shrub, and barren areas and likely use wet meadows, montane chapparal, and montane riparian (CDFG 1990). They also can travel over extremely rugged topography (Copeland & Yates 2006). In California, wolverines are considered a scarce resident of the north coast mountains and the Sierra Nevada and have been sighted from Del Norte, Trinity, Shasta and Siskiyou Counties in the north, and south along the crest of the Sierra

Nevada to Tulare County (CDFG 1990). Because wolverines are wary and elusive and sightings are rare, accurate population estimates are difficult to obtain. Observations of wolverines in California have occurred between 1,600 and 10,800 feet in elevation (CDFG 1990).

Wolverines have extremely large home ranges (up to 375 square miles) (Hornocker & Hash 1981) and may undertake extensive daily and seasonal movements (Inman et al. 2004; Copeland & Yates 2006). Wolverines are considered a solitary species, with adults apparently associating only during the breeding season. Recent research indicates that male home ranges may overlap (up to 30 percent) while female home ranges are exclusive or have very limited overlap (Krebs & Lewis 2000; Copeland & Yates 2006).

Habitat for wolverines is more likely defined by distribution and abundance of food and structures for denning and avoidance of high temperatures, humans, or human caused disturbances than specific vegetative parameters (Hornocker & Hash 1981; Weir 2004). Throughout the year wolverines use a wide variety of structural stages although mature and old forest stages may be used predominately (Weir 2004).

Wolverines use caves, hollows in cliffs, logs, rock outcrops, and burrows for cover, generally in denser forest stages (CDFG 1990). They den in caves, cliffs, hollow logs, cavities in the ground, under rocks, and may dig dens in snow or use beaver lodges (CDFG 1990; Magoun & Copeland 1998; Krebs & Lewis 2000; Weir 2004; Copeland & Yates 2006).

Studies have shown the importance of large mammal carrion, notably ungulate carrion to wolverines; and the availability of large mammals underlies the distribution, survival, and reproductive success of this species (Banci 1994). Deer and elk populations may be enhanced by the provision of early seral stages through logging or burning. However, these activities may exclude wolverines from areas that ungulates still use if these habitats do not provide for the wolverine’s other life needs (Banci 1994).

Numerous carnivore surveys have been conducted within and adjacent to the project area in the Rogue-Siskiyou and Klamath National Forests and on private lands in northern California in the past decade, including: over 150 baited camera stations on the Cascade Zone of the Rogue River National Forest and baited stations in the Ashland Watershed (USDA Forest Service 2005b); 12 track plate and camera stations that were periodically monitored by the KNF on the Oak Knoll and Scott River ranger districts from 1992-1996 (USDA Forest Service no date); 19 4-square-mile survey areas in the Collins-Baldy LSR in 2004 (Farber & Franklin 2005); 60 track plate stations monitored by the USFWS on the Oak Knoll and Scott River ranger districts in 2005 and 2006 (S. Yaeger, pers. comm. 2006) and 21 4-square mile survey areas in the Mount Ashland LSR and adjacent private lands (Farber & Criss 2006). None of these efforts detected wolverines.

There have been unconfirmed sightings of wolverines on the Scott River Ranger District on Scott Bar Mountain and in the Canyon Creek watershed approximately 26 miles southwest of the project area. However, there are no historic records of this species in the project area. Due to the large home ranges used by wolverines, their ability to travel long distances over rugged terrain, the variety of habitats that they use, and the proximity of remote, rugged habitats in Wilderness areas, it is expected that wolverines may disperse into or forage in the project area, either as part of individual home ranges or as individuals dispersing through the area. Based on home range sizes and limited intrasexual territoriality of the species, there is the potential that one reproductive unit (1 male and 1 or more females) overlaps with the action area.

Effects of the proposed alternatives
Alternative 1 – No action
In the absence of large scale natural disturbance, it is unlikely that the amount of wolverine habitat in the project area will significantly change in the near future. FVS modeling indicates that important structural components for denning and cover such as large diameter DWD will be slow in developing. Additionally, FFE modeling indicates a pattern of fire behavior and fire induced tree mortality over time that would increase the likelihood that these habitat components would be removed in the event of a fire.

Alternatives 2, 4, and 5 – Action Alternatives
The action alternatives would have similar effects to wolverines and will be discussed together.

Thinning and Fuels Reduction
Thinning and fuels reduction treatments may remove individual snags or large DWD that may be used for cover or denning. However, by retaining MLSRA recommendations for these habitat components impacts to wolverine habitat are expected to be negligible. Thinning and fuels reduction activities will employ heavy machinery and may require repeated visits to a site. Because wolverines are sensitive to human disturbance, these activities will likely prevent wolverines from using the project area during implementation. Thus, normal movement patterns or foraging activities may be disrupted.

Thinning is expected to have long-term benefits to wolverines by promoting the development of late-successional habitat. Additionally, FFE modeling also indicates that the proposed thinning and fuel treatments would change expected fire behavior over time, resulting in fires of less intensity. Thus, reducing the potential that existing wolverine habitat will be removed. By reducing the density of overstocked stands, thinning may also improve habitat for deer, an important prey species.

Temporary Road and Landing Construction
Temporary road and landing construction may remove individual snags or large DWD that may be used for cover or denning. At the scale of a wolverine's home range, these impacts to habitat are expected to be negligible. However, temporary road and landing construction will employ heavy machinery that will create noise above ambient levels and increase the likelihood that wolverines will avoid the area.

Road Related Activities

Road related activities are not expected to remove suitable habitat but will employ heavy machinery and increase the likelihood that wolverines will avoid the area.

Cumulative Effects

The project area is predominately federal lands with small in-holdings of private ownership. Prior to European settlement the majority of the Beaver Creek watershed, which includes the project area, was late-successional mixed conifer forest. During the railroad logging era (1910 – 1932) the project area was privately owned and was extensively harvested - an estimated 90 percent of the trees within the project area were removed. During this era pine was the preferred species with the largest trees on the landscape being targeted for removal. After acquiring many of the railroad logged land, partial cutting during the 1950s – 1970s by the KNF, further contributed to changes in distribution of late-successional stands. Similar to railroad logging, KNF partial cuts primarily targeted large trees but did not focus on pine. Although the extent of impacts to wolverine habitat on the privately owned lands within the project area is unknown, it is expected that important components of wolverine habitat have been removed. Reasonably foreseeable future actions in the project area include small scale timber harvest on private lands. These activities will likely remove wolverine habitat components but are not expected to be significant. Other federal projects planned in the project area include ongoing pre-commercial thinning in existing plantations, grazing, and dispersed recreation.

By introducing a large amount of human disturbance on the landscape, these cumulative actions may preclude the use of the project area by wolverines.

Determination

The amount of human disturbance associated with project implementation may impact normal movement patterns and foraging behavior, thus, the project **"may impact individuals, but is not likely to result in a trend toward federal listing or a loss of viability,"** for California wolverines.

6) **Pacific Fisher**

Environmental Baseline

Fishers are a FS Region 5 Sensitive Species due to the loss and fragmentation of habitat across California, as well as the fact that they are easily trapped. FEMATs' analysis of the NWFP gave the fisher a 63 percent chance of remaining well distributed throughout the northwest and a 37 percent chance that it would become locally restricted. The USFWS was petitioned to list the fisher by several environmental organizations in November 2000. After a 12-month review, the USFWS found the Pacific fisher to be a distinct population segment (DPS) and gave a "warranted but precluded" decision to the petition. As a result of that decision, the West Coast DPS has become a Federal Candidate species under the ESA (USDI Fish and Wildlife Service 2004).

Historically, fishers were distributed across North America from Hudson Bay southward to Virginia in the east and to Yellowstone and the southern Sierra Nevada in the west. By 1900, trapping and logging had led to extirpations of fishers from most of the eastern

United States. Regrowth of forest and regulation of trapping in New England and the northern Great Lakes states and numerous reintroductions have allowed fisher to recolonize those areas (Carroll et al. 1999). Populations in the western United States, however, have continued to decline (Powell & Zielinski 1994), resulting in the apparent extirpation of fishers throughout much of their historical range in the Pacific states (Zielinski et al. 1995; Lewis & Stinson 1998; Aubry & Lewis 2003). The population in the Klamath Region, which includes the project area, may be the largest remaining in the western United States (Carroll et al. 1999). Fisher's typically avoid humans and as a result they are generally more common where human disturbance is limited (Powell & Zielinski 1994).

Fisher home range size is variable and likely reflects habitat quality (Zielinski et al. 2004a). Using studies from across the United States, Powell and Zielinski (1994) calculated a mean home range size of approximately 25 square miles for males and 10 square miles for females.

Habitat for fisher is typically characterized as mature, structurally complex, conifer and mixed conifer-hardwood forest (Buskirk & Powell 1994; Zielinski et al. 2006). Habitat necessary for denning, foraging, and daily resting bouts constitute the specific habitat requirements for this species (Zielinski et al. 2006). It is assumed that fishers will use patches of habitat that are connected by forested stands, but will not likely use patches of habitat that are separated by large openings or areas lacking adequate canopy cover (Buskirk & Powell 1994).

In the western United States fisher den sites are usually located in forested stands with complex structural characteristics typical of late-successional forests (Powell & Zielinski 1994). These characteristics include large trees and snags, multi layered vegetation, large woody debris, and high canopy closure. Cavities in large trees or snags are most commonly used for denning, but hollow logs may also be used (Lewis & Stinson 1998; Powell & Zielinski 1994).

Fisher diets are diverse and typically include small and medium-sized mammals, birds, carrion, reptiles, insects, and plants (Powell & Zielinski 1994; Zielinski et al. 1999; Zielinski & Duncan 2004). Because of the variability in their diet, prey can occur in a variety of forest types and seral stages (Powell & Zielinski 1994). Habitat used for foraging is more likely associated with the structural attributes that lead to abundant prey species and reduced vulnerability to predation and can be fulfilled at locations that do not have mature forest elements (Powell 1993; Truex & Zielinski 2005).

Fishers appear to be more selective of habitat for resting than foraging (Powell & Zielinski 1994). Fishers typically choose structurally diverse, closed canopy forests with the largest woody structure (both live trees and snags) available for resting bouts (Powell & Zielinski 1994; Zielinski et al. 2004b; Zielinski et al. 2006) but may rest in younger or managed stands if large remnant structures exist (Jones 1991; Yaeger 2005). Rest sites include a variety of structures including mistletoe brooms, squirrel and raptor nests, and brush piles but most commonly occur in cavities of large live and dead trees or large diameter logs (Powell & Zielinski 1994; Weir & Harestad 2003; Zielinski et al. 2004b).

In more xeric areas, rest sites are typically located near drainage bottoms close to water (Zelinski et al. 2004b; Yaeger 2005). Rest sites are seldom reused, suggesting that fishers require multiple rest sites distributed throughout their home range (Zielinski et al. 2006).

Within the project area mature, structurally diverse stands that provide high quality denning and resting habitat are limited, but occur in the higher elevation true fir and mixed conifer and scattered pockets of mid-elevation mixed conifer stands. Within the high elevation true fir and mixed conifer there are approximately 600 acres of denning and resting habitat. The only contiguous block (greater than 50 acres) of denning and resting habitat occurs in the extreme northeast corner of the project area in the true fir zone. Higher quality denning and resting habitat in the mid-elevation mixed conifer zone is distributed in small patches (typically 25 acres or less) and totals approximately 1,000 acres. Other potential denning and resting sites occur in second growth stands where large, residual components of the original stand exist. Potential foraging habitat is more widely distributed and occurs in larger blocks.

Numerous carnivore surveys have been conducted within and adjacent to the project area on the KNF and on private lands in the past decade. Most recently, Farber & Criss (2006), recorded a detection of a fisher in a high elevation, mature true fir stand in the extreme northeast corner of the project area. Their remaining 11 camera stations located within the project area failed to detect fishers. Farber & Criss also detected fisher at six other camera stations approximately 3.5 to seven miles west and southwest of the project area. Numerous other detections of fisher have occurred within 10 to 12 miles, south and southwest of the project area (Farber & Franklin 2005; S. Yaeger, pers. comm. 2006).

Effects of the proposed alternatives
Alternative 1 – No action
Under the no action alternative, high-quality, structurally-complex fisher habitat would be slow in developing. FVS modeling indicates that 50 years from present stands will still be dense (greater than 340 trees and 285 square feet basal area/acre), dominated by trees less than 12.5 inches in diameter at breast height (dbh), and contain ≤ 9 trees greater than 30” per acre. Although these stands would have a high canopy closure and scattered denning and rest sites, they would still not resemble the complex structural characteristics typically associated with high-quality fisher habitat. Additionally, density related mortality is expected to continue, with between 35 to 60 percent of the extant trees dying within that period. Thus, surface fuels are expected to dramatically increase over time. In the event of a fire start, FFE modeling indicates several general patterns regarding fire behavior and fire induced tree mortality over time including (1) a constant or increasing crown fire potential under both moderate and severe weather conditions, (2) an increase in surface fire intensity under both moderate and severe weather conditions, and (3) either a constantly high or increasing level of tree mortality and basal area reduction. Thus, the no action alternative does little to promote the development of fisher habitat and increases the potential for fire to remove existing fisher habitat.

Alternatives 2, 4, and 5 – Action Alternatives

The action alternatives would have similar effects to fisher and will be discussed together except where specifically stated otherwise.

Thinning and Fuels Reduction

Thinning designed to promote the development of late-successional habitat will not remove important structural components of fisher habitat such as large diameter trees, snags, and DWD. Trees infected with mistletoe which may provide resting structure may be removed, but prescriptions have been designed to ensure that this component will remain on the landscape. Thinning prescriptions are also designed to leave a minimum of 15 percent of each stand unthinned as well as a minimum canopy closure of 60 percent in existing NSO nesting, roosting, or foraging habitat. Thus, the action alternatives are not expected to significantly impact habitat connectivity for fisher. Thinning to create DFPZ's may impact fisher habitat by removing large diameter trees (> 20"), snags, and DWD. The removal of large diameter trees would only occur under limited circumstances (see chapter 2) and where consistent with DFPZ objectives large diameter DWD will be retained. Therefore, impacts to the distribution and abundance of potential denning and rest sites are expected to be minimal. Thinning prescriptions are also designed to minimize habitat fragmentation and to ensure that the DFPZ's will not result in large canopy gaps. Fuel reduction treatments have the potential to remove snags and DWD. However, prescriptions are designed to retain MLSRA recommendations for these components. Thus, fuel reduction treatments are not expected to have a significant impact to the important structural components of fisher habitat.

Thinning and fuel reduction treatments also have the potential to impact some fisher prey species by removing or reducing the availability of important habitat components. However, where thinning treatments similar to those proposed in this project have been applied, effects to small mammal species commonly found in fisher diets have been shown to be insignificant or of short duration (Carey & Wilson 2001; Suzuki & Hayes 2003). Chang's (1996) summary of the response of small mammals to fire in the Sierra Nevada's indicates that many species commonly found in fisher diets may be killed in large, rapid moving wildfires. However, less intense fires, such as the underburns prescribed for this project, had less detrimental effects. Because fisher's have a diverse diet and may switch prey in response to changing density (Zielinski et al. 1999), they would likely find abundant prey in the event of a short-term reduction in some prey species following a prescribed fire.

Temporary Road and Landing Construction

No temporary road or landing construction is proposed in high quality denning or resting habitat. Temporary road and landing construction however will remove some large trees suitable for denning or roosting and will remove between 31 and 53 acres of potential foraging habitat.

To ensure that impacts to fisher habitat are minimized, all trees greater than 24" that need to be felled for a temporary road or landing will be left on site. Although temporary road construction will contribute to the fragmentation of fisher habitat, particularly in the upper portion of the Siskiyou Gap DFPZ under alternatives 2 and 4, openings created by temporary roads are not expected to provide barriers to fisher movements.

Road Related Activities
Road related activities, including maintenance, closures, and decommissioning is not expected to remove any important structural components of fisher habitat.

Cumulative Effects
The project area is predominately federal lands with small in-holdings of private ownership. Much of the project area is bounded by industrial timber lands. Prior to European settlement the majority of the Beaver Creek watershed, which includes the project area, was late-successional mixed conifer forest. During the railroad logging era (1910 – 1932) the project area was privately owned and was extensively harvested - an estimated 90 percent of the trees within the project area were removed. During this era pine was the preferred species with the largest trees on the landscape being targeted for removal. Thus, at the conclusion of the railroad logging era fisher habitat in the project area was limited to higher elevation true fir stands and scattered pockets of mixed conifer at lower elevations. After acquiring much of the railroad logged area in land exchanges, the KNF conducted partial cuts during the 1950s – 1970s, further contributing to changes in distribution and abundance of fisher habitat. Similar to railroad logging, KNF partial cuts primarily targeted large trees but did not focus on pine. Although the extent of impacts to fisher habitat on privately owned lands within the project area is unknown, it is expected that important components of fisher habitat have been removed. Reasonably foreseeable future actions within the project area include small scale timber harvest on private lands. Although fisher denning and resting habitat is not expected to be abundant in these areas, these activities will likely continue to degrade habitat. Other federal projects or activities planned in the project area include ongoing pre-commercial thinning in existing plantations, grazing, and dispersed recreation. These activities are not expected to impact fisher habitat.

Determination
Because the action alternatives will remove potential foraging habitat and structural components suitable for denning or resting, the project **"may impact individuals, but is not likely to result in a trend toward federal listing or a loss of viability,"** for fisher.

7) **American Marten**
Environmental Baseline
The American marten (marten) is listed as a FS Region 5 Sensitive Species due to loss and fragmentation of habitat, and the fact that they are easily trapped. FEMATs analysis of the NWFP gave the marten a 67 percent chance of remaining well distributed throughout the northwest. In the KLRMP, additional S&Gs for coarse woody debris and snags provide additional protection of habitat components for marten.

In the western United States, martens inhabit mature, late-successional stands of mesic coniferous forests and are often associated with high-elevation spruce-fir forests (Buskirk & Powell 1994; Powell et al. 2003). Complex structure near the forest floor such as low hanging limbs, logs, stumps, and/or squirrel middens are important to martens because they provide subnivean access to prey, cover from predators, and thermoregulation (Buskirk 1984; Buskirk & Powell 1994; Buskirk & Ruggerio 1994; Powell et al. 2003). Large diameter logs, snags, or live trees are important structures for denning and resting sites (Buskirk 1984; Buskirk et al. 1989; Ruggiero et al. 1998). A low and closed canopy has also been shown to be an important habitat component for martens (Koehler & Hornocker 1977; Hargis & McCullough 1984).

Based on specimens of marten taken at known localities in California, Grinnell et al. (1937 cited in Kucera et al. 1995) concluded that "two well-marked races occur within the State [of California]". The Humboldt marten, *M. americana humboldtensis*, occurs in the coastal redwood zone and the Sierra Nevada marten, *M. a. sierrae*, occurs from Trinity and Siskiyou counties east to Mt. Shasta and south through the Sierra Nevada. There is only one known population of Humboldt marten on the coast which occupies less than 5 percent of its historical range (Slauson et al. 2001, Slauson et al. 2003). Based on range maps in Powell et al. (2003) the project area is outside of the range for both races.

Between 1989 and 1997 extensive surveys for American martens occurred through northern California and southern Oregon (see Kucera et al. 1995 and Zielinski et al. 1998). Results of these surveys indicate that martens appear to occupy much of their historic range although gaps in their distribution are evident. Locally, these survey efforts detected martens in eastern Siskiyou County approximately 35 miles southeast of the project area, however, no martens were detected in western Siskiyou County.

Within and immediately adjacent to the project area, numerous carnivore surveys have been conducted over the past decade. These include 12 track plate and camera stations that were periodically monitored by the KNF on the Oak Knoll and Scott River ranger districts from 1992 to 1996 (USDA Forest Service no date); 19 baited camera stations in the Collins-Baldy LSR in 2004 (Farber and Franklin 2005); 60 track plate stations monitored by the USFWS on the Oak Knoll and Scott River ranger districts in 2005 and 2006 (S. Yaeger, pers. comm. 2006) and 21 baited camera stations in the Mount Ashland LSR and adjacent private lands (Farber & Criss, 2006). These combined survey efforts resulted in only a single marten detection in 2005 (S. Yaeger, pers. comm. 2006) approximately 28 miles southwest of the project area. It is not known if this animal is associated with a population within the Marble Mountain Wilderness or if it is a dispersing individual from the coastal population.

Within the project area potential habitat for martens is restricted to the higher elevation, mature true fir stands.

Effects of the proposed alternatives

Alternative 1 – No action

In the absence of large scale natural disturbance it is unlikely that the amount of marten habitat in the project area will significantly change in the near future. However, FFE modeling indicates that in the event of a fire crown fire potential and expected mortality in true fir stands within the project area will increase over time. Thus, important habitat components such as large diameter trees, snags, and DWD and complex structure near the forest floor would likely be removed.

Alternatives 2, 4, and 5 – Action Alternatives
The action alternatives would have similar effects to martens and will be discussed together except where specifically stated otherwise.

Thinning and Fuels Reduction Treatments
Thinning and fuels reduction treatments are proposed in approximately 25-35 acres of potential marten denning and resting habitat. Thinning designed to promote the development of late-successional habitat will not remove important structural components of marten habitat such as large diameter trees, snags, and DWD. Additionally, 60 percent canopy cover will be retained in true fir stands. Under alternatives 2 and 4, approximately five acres to be treated occur in a DFPZ. Thus, it is expected that important components of marten habitat such as large DWD and complex structure near the forest floor will be removed. Fuel reduction treatments also have the potential to remove components of marten habitat. Although, prescriptions have been designed to meet MLSRA recommendations for DWD, underburning would likely remove other important structure near the forest floor.

In the long term, thinning treatments are expected to benefit marten by increasing the amount and distribution of denning and resting habitat as well as provide complex structure near the forest floor. FVS modeling indicates that 50 years post thinning the average tree diameter within a stand would increase to between 24 and 27" and 14 to 15 trees per acre >30" would be expected. More large stems per acre would also increase recruitment of large snags and DWD. Stands exhibiting these characteristics provide the habitat components needed for denning, resting, and subnivean access. FFE modeling also indicates that thinning and subsequent fuels treatment will generally reduce crown fire potential and maintain a surface fire type and significantly reduce predicted stand mortality in the event of a fire start. These factors indicate that stands providing habitat for marten will be more resistant to large-scale fires.

Temporary Road and Landing Construction
No temporary road or landing construction is proposed in marten habitat.

Road Related Activities
Road related activities are not expected to impact marten habitat.

Cumulative Effects
Because true fir was not a sought after species, the railroad logging era had little impact to marten habitat. Although the actual amount removed since that time is unknown, timber harvest has likely impacted potential marten habitat within the project area. Timber harvest on private and Bureau of Land Management lands likely removed marten habitat from the northcentral portion of the project area (Section 30 of Township 40S; Range 1E). Currently this section is virtually absent marten habitat. Similarly, the

amount of potential marten habitat that was removed during timber harvest on approximately 25 acres of private lands in Section 26 of Township 40S; Range 1W is unknown. However, that parcel currently provides no marten habitat. Other planned projects or activities expected to occur on federal land within the Project area include ongoing pre-commercial thinning in existing plantations, grazing, and dispersed recreation. These activities are not expected to impact marten habitat. Due to the limited impacts to marten habitat, the action alternatives will not significantly augment the cumulative impacts to marten.

Determination
Because structural components of marten habitat may be removed, the project **"may impact individuals, but is not likely to result in a trend toward federal listing or a loss of viability,"** for marten.

8) **Pallid Bat**
Environmental Baseline
Pallid bats are listed as a FS Region 5 Sensitive Species because of the increasing use of caves by humans. Pallid bats are very sensitive to disturbance at their maternity and hibernating roost sites. It is important that these sites remain undisturbed because these sites are essential for metabolic economy and juvenile growth (CDFG 1990).

Pallid bats are known to occur across the Pacific Northwest. Pallid bats will use a variety of habitats, including grasslands, shrublands, woodlands, and mixed conifer but are most common in open, dry habitats with rocky areas for roosting (CDFG 1990; Cross et al. 1996). Suitable habitat for day roosts includes rock crevices, tree hollows, mines, caves and a variety of human-made structures (Vaughn & O'Shea 1976; CDFG 1990; Cross et al. 1996) while night roosts are typically more open and include open buildings, porches, mines, caves, and under bridges (Lewis 1994; Szewczak et al. 1998; Cross et al. 1996). Pallid bats forage in the air as well as on the ground and prey on items including crickets, beetles, grasshoppers, and some small vertebrates (Csuti et al. 1997).

Suitable roost sites for pallid bats in the form of large trees and snags are scattered throughout the project area. Other structures including buildings and bridges also occur within the project area. Although surveys have not been conducted within the project area, pallid bats have been captured less than ten miles away (see USDA Forest Service 2005b). Because suitable roost sites are fairly common and the verified presence adjacent to the project area, it is reasonable to conclude that pallid bats are present within the project area.

Effects of the proposed alternatives
Alternative 1 – No action
In the absence of large scale natural disturbance it is unlikely that the amount of pallid bat habitat in the project area will significantly change in the near future. FVS modeling indicates that 50 years from present stands will have more large trees per acre suitable for roosting but this habitat component will still not be abundant. FFE modeling indicates that fire intensity and resulting tree mortality will increase over time. Although fire may

produce roost sites by creating tree hollows, high intensity fire has the potential to remove existing sites.

Alternatives 2, 4, and 5 – Action Alternatives
The action alternatives would have similar effects to pallid bats and will be discussed together.

Thinning and Fuels Reduction
Thinning and fuels reduction treatments may remove individual large trees or snags that may be used for roosting. By meeting MLSRA recommendations for snags and because the removal of large trees would only occur under limited circumstances, impacts to roosting habitat are expected to be minimal. However, the action alternatives propose activities within and adjacent to potential roosting habitat. Because pallid bats are sensitive to disturbance at roost sites, these actions would likely have an effect on roosting behavior if bats are present.

Thinning is expected to have long-term benefits for pallid bats by promoting the development of large diameter trees which may provide suitable roosting sites. Additionally, FFE modeling also indicates that the proposed thinning and fuel treatments would change expected fire behavior over time, resulting in fires of less intensity, thus, reducing the potential that existing habitat will be removed.

Temporary Road and Landing Construction
Temporary road and landing construction may remove individual large trees that may be used as roost sites. Additionally, these activities may occur adjacent to possible roost sites, increasing the potential to disrupt roosting behavior.

Road Related Activities
Road related activities are not expected to remove suitable habitat but may occur adjacent to potential roost sites.

Cumulative Effects
Past timber activities in the project area has impacted pallid bats by removing potential roost sites, although large diameter trees remain scattered throughout. Additionally, the construction of roads has likely affected these bats by increasing the potential for human disturbance at roost sites. Reasonably foreseeable future actions in the project area include small scale timber harvest on private lands. These activities may remove individual large trees and snags and increase the potential to disturb roost sites, but due to the scale of these projects they are not expected to be significant. Other federal projects planned in the project area include ongoing pre-commercial thinning in existing plantations. While pre-commercial thinning will not remove habitat it has the potential to disturb adjacent roost sites.

Determination
Because large trees and snags that provide potential roost sites may be removed and activities with the potential to disturb roost sites are proposed, the project **"may impact**

individuals, but is not likely to result in a trend toward federal listing or a loss of viability," for the pallid bat.

9) **Townsend's Big-eared Bat**
Townsend's big-eared bats are listed as a FS Region 5 Sensitive Species due to a steep decline in numbers and its high sensitivity to human disturbance at roost sites.

Townsend's big-eared bats occur throughout the western United States. In California, the species utilizes a wide variety of habitats and can be found from sea level up to 10,000 feet (Pierson & Fellers 1998; Szewczak et al. 1998). Distribution of this species is strongly correlated with the availability of caves and cave-like roosting habitat although the species also makes use of man-made structures such as abandoned buildings, water diversion tunnels, and bridges (Maser 1998; Pierson & Fellers 1998; Fellers & Pierson 2002). Large diameter trees have also been shown to be used for roosting in California coastal forests (Fellers & Pierson 2002; Mazurak 2004). Foraging associations include edge habitats along streams and areas adjacent to and within a variety of wooded habitats (Fellers & Pierson 2002). The Townsend's bat is a moth specialist, with over 90 percent of its diet composed of lepidopterans (Sherwin 1998).

Townsend's big-eared bats are extremely sensitive to disturbance at roost sites (Humphrey & Kuntz 1976) and may abandon a roost site following a single disturbance (CDFG 1990).

There are no caves or open mines within the project area. However, suitable roost sites for Townsend's big-eared bats in the form of large diameter trees are scattered throughout the project area and other structures including buildings and bridges are also present. Thus, it is reasonable to assume that Townsend's big-eared bats are present in the project area. .

Effects of the proposed alternatives
Alternative 1 – No action
In the absence of large scale natural disturbance it is unlikely that the amount of Townsend's big-eared bat habitat in the project area will significantly change in the near future. FVS modeling indicates that 50 years from present stands will have more large trees per acre suitable for roosting but this habitat component will still not be abundant. FFE modeling indicates that fire intensity and resulting tree mortality will increase over time. Although fire may produce roost sites by creating tree hollows, high intensity fire has the potential to remove existing sites.

Alternatives 2, 4, and 5 – Action Alternatives
The action alternatives would have similar effects to Townsend's big-eared bats and will be discussed together.

<u>Thinning and Fuels Reduction</u>
Thinning and fuels reduction treatments may remove individual large trees or snags that may be used for roosting. By meeting MLSRA recommendations for snags and because

the removal of large trees would only occur under limited circumstances, impacts to roosting habitat are expected to be minimal. However, the action alternatives propose activities within and adjacent to potential roosting habitat. Because these species are sensitive to disturbance at roost sites, these actions would likely have an effect on roosting behavior if bats are present.

Thinning is expected to have long-term benefits for Townsend's big-eared bats by promoting the development of large diameter trees which may provide suitable roosting sites. Additionally, FFE modeling also indicates that the proposed thinning and fuel treatments would change expected fire behavior over time, resulting in fires of less intensity, thus, reducing the potential that existing habitat will be removed.

Temporary Road and Landing Construction
Temporary road and landing construction may remove individual large trees that may be used as roost sites. Additionally, these activities may occur adjacent to possible roost sites, increasing the potential to disrupt roosting behavior.

Road Related Activities
Road related activities are not expected to remove suitable habitat but may occur adjacent to potential roost sites.

Cumulative Effects
Past timber activities in the project area has impacted Townsend's big-eared bats by removing potential roost sites, although large diameter trees remain scattered throughout. Additionally, the construction of roads has likely affected these bats by increasing the potential for human disturbance at roost sites. Reasonably foreseeable future actions in the project area include small scale timber harvest on private lands. These activities may remove individual large trees and snags and increase the potential to disturb roost sites, but due to the scale of these projects they are not expected to be significant. Other federal projects planned in the project area include ongoing pre-commercial thinning in existing plantations. While pre-commercial thinning will not remove habitat it has the potential to disturb adjacent roost sites.

Determination
Because large trees and snags that provide potential roost sites may be removed and activities with the potential to disturb roost sites are proposed, the project **"may impact individuals, but is not likely to result in a trend toward federal listing or a loss of viability,"** for the Townsend's big-eared bat.

10) **Northwestern Pond Turtle**
Environmental Baseline
In the Pacific Northwest the distribution of western pond turtles (*Clemmys marmorata*) is disjunct but includes southern Oregon and northern California (CDFG 1988; Leonard et al. 1993). The northwestern pond turtle, which is recognized as a subspecies of the western pond turtle (Stebbins 2003) is found only in northern California (Ashton et al. 1997). Western pond turtles are listed as a FS Region 5 Sensitive Species because of

declining populations, population fragmentation, habitat alteration and loss, pollution, and illegal collection.

Western pond turtles are a highly aquatic species that can be found in ponds, lakes, streams, rivers, marshes, and irrigation ditches that have a muddy or rocky bottom and abundant vegetation (Stebbins 2003). They generally require emergent basking sites (Nussbaum et al. 1983) which are important for thermoregulation and growth (Koper & Brooks 2000; Grayson & Dorcas 2004). They feed on aquatic plants, insects, worms, fish, amphibian eggs and larvae, crayfish, and carrion (Stebbins 2003).

Western pond turtles use terrestrial habitat for nesting and sometimes for overwintering. Females lay their eggs in soil and have been recorded nesting up to 300 feet from water (Holland 1994). Reese and Welsh (1997) reported that individuals moved an average of approximately 600 feet from water to their overwintering sites. Western pond turtles have also been reported to hibernate in mud.

Potential habitat for northwestern pond turtles is restricted to a five acre holding pond and its adjacent forest in the southern portion of the project area.

Effects of the proposed alternatives
Alternative 1 – No action
In the absence of large scale natural disturbance, particularly a flood event, it is unlikely that the amount of northwestern pond turtle habitat would change.

Alternatives 2, 4, and 5 – Action Alternatives
The action alternatives would have similar effects to northwestern pond turtles and will be discussed together.

<u>Thinning and Fuels Reduction</u>
Thinning and fuels reduction treatments will have no effect on aquatic northwestern pond turtle habitat. By promoting the development of large diameter trees and recruitment of large DWD, the action alternatives would likely increase the recruitment of potential basking sites into existing habitat. However, the approximately 12 acres of thinning and fuels reduction treatments proposed within 600 feet of the holding pond, have the potential to kill or injure overwintering or nesting turtles.

<u>Temporary Road and Landing Construction</u>
No temporary roads or landings are proposed adjacent to the holding pond.

<u>Road Related Activities</u>
No road related activities are proposed adjacent to the holding pond.

Cumulative Effects
Past logging activities that occurred adjacent to the holding pond may have killed or injured individual turtles. It is likely that past logging activities have also reduced the recruitment of basking sites into the holding pond by reducing the recruitment of DWD.

Reasonable foreseeable future actions expected to occur adjacent to the holding pond include grazing. This activity is not expected to impact northwestern pond turtles .

Determination
Because thinning and fuels reduction activities that have the potential to kill or injure overwintering or nesting turtles are proposed within 600 feet of the holding pond, the project **"may impact individuals, but is not likely to result in a trend toward federal listing or a loss of viability,"** for the northwestern pond turtle.

11) **Foothill Yellow-legged Frog**
Environmental Baseline
Foothill yellow-legged frogs are listed as a FS Region 5 Sensitive Species because of declining populations. Many of the same reasons for decline listed for the western pond turtle also apply to this frog.

The range of the foothill yellow-legged frog extends from west-central Oregon to southern California (Stebbins 2003). This species is almost always found near water and are most common in streams with a rocky or gravelly substrate (Nussbaum et al. 1983: Stebbins 2003). Breeding takes place in shallow, slow moving water (Fuller & Lind 1992; Leonard et al. 1993). Streams occupied by foothill yellow-legged frogs are located in a variety of habitats, including valley-foothill hardwood, valley-foothill hardwood-conifer, valley-foothill riparian, ponderosa pine, mixed conifer, coastal scrub, mixed chaparral, and wet meadow types (CDFG 1988; Blaustein et al. 1995). Adults eat aquatic and terrestrial invertebrates while tadpoles forage on algae (Nussbaum et al. 1983).

In-stream environments within the project area are characterized by steep gradients and fast currents. There are no shallow, low gradient waters suitable for foothill yellow-legged frog's reproduction.

Effects of the proposed alternatives
There are no shallow, low-gradient waters suitable for yellow-legged frog breeding. Therefore, the action alternatives will have no effect on foothill yellow-legged frogs.

Cumulative Effects
The action alternatives will have no effect on foothill yellow-legged frogs; therefore, there will be no cumulative effects from the proposed alternatives combined with other actions in the project area.

Determination
The project will have **"no effect"** on foothill yellow-legged frogs.

12) **Cascade Frog**
Environmental Baseline
Cascade frogs are listed as a FS Region 5 Sensitive Species because of declining populations. Many of the same reasons for decline listed for the western pond turtle also apply to this frog.

Cascade frogs range from northern Washington to north-central California (Stebbins 2003) and have been confirmed to occur approximately 25 miles southwest of the project area (Welsh & Pope 2004).

Cascade frogs are closely associated with water and are found in mountain lakes, small streams, and ponds and their surrounding vegetation (Stebbins 2003). Most common in small pools of streams flowing through subalpine meadows or in aquatic environments in open coniferous forests (Leonard et al. 1993; Stebbins 2003). Eggs are attached to vegetation in shallow water of stream pools, lake margins, and ponds (CDFG 1988; Leonard et al 1993). This species hibernates in the mud on the bottom of lakes and ponds during winter (Briggs 1987).

It is found in areas lacking predatory fish, as fish (including salmonids) predate these frogs. Nesting generally occurs in water sources that can have many un-shaded hours of daylight and standing water is required for reproduction. Developing egg masses are affected by UV radiation (CDFG 1988; Nussbaum et al. 1983).

Suitable habitat for Cascades frogs within the project area consists of one five acre pond. This pond provides potential breeding and hibernating habitat. Streams within the project area are characterized by steep gradients and fast currents and do not provide breeding and hibernating habitat.

Effects of the proposed alternatives
Alternative 1 – No action
In the absence of large scale natural disturbance it is unlikely that the amount of Cascade Frog habitat would change. FFE modeling indicates that surface fire intensity and resulting tree mortality will increase over time, thus, increasing the likelihood that shading of existing Cascaded frog habitat will be reduced.

Alternatives 2, 4, and 5 – Action Alternatives
The action alternatives would have similar effects to Cascade frogs and will be discussed together.

Thinning and Fuels Reduction
Project design features include a 150 buffer around the holding pond in which only pre-commercial thinning may occur. Thus, thinning activities are not expected to affect the amount of shade over the holding pond. Although prescribed fires will not be set within this buffer, underburns may be allowed to back into this area. However, these types of underburns are not expected to have a significant impact on overtstory trees and pond shading. Thinning and fuels treatments will not have any direct effects to the pond and thus will not impact Cascade Frog breeding or hibernating habitat. FFE modeling also indicates a change in fire behavior over time that would decrease the likelihood that shading of Cascade frog habitat would be impacted.

Temporary Road and Landing Construction

No temporary roads or landings are proposed adjacent to the holding pond.

Road Related Activities
No road related activities are proposed adjacent to the holding pond.

Cumulative Effects
The action alternatives will have no effect on Cascades frogs; therefore, there will be no cumulative effects from the proposed alternatives combined with other actions in the project area.

Determination
The project will have **"no effect"** on Cascade frogs.

13) **Blue-gray taildropper**
Environmental Baseline
Blue-gray taildroppers are listed as FS Region 5 Sensitive Species due to a small number of known sites.

The blue-gray taildropper ranges from southern Washington to northern California (Duncan et al. 2003). In 1999 and 2000, about 100 randomly-selected, 10-acre plots were surveyed for terrestrial mollusks on the KNF. These surveys discovered eleven and eight sites on the Goosenest and Happy Camp Ranger Districts, respectively.

The blue-gray taildropper, is a forest-dwelling slug. Typical habitat for this species includes moist, usually late-successional forests, or second growth forests with late-successional attributes, often with a hardwood component (Burke et al. 2000). The blue-gray taildropper normally comes to surface during moist conditions and is otherwise thought to be subterranean. Its habitat has been described as, "sites with relatively higher shade and moisture levels than those of the general forest habitat" (Duncan et al. 2003). It is usually associated with partially decayed logs, leaf and needle litter (especially hardwood leaf litter), mosses and moist plant communities such a big-leaf maple and sword fern associations (Burke et al. 2000; Duncan 2003).

Potential habitat for the blue-gray taildropper does exist within the project area. However, the likelihood that this species occurs in the project area is small for the following reasons: (1) potential habitat is patchy and not widely distributed; (2) the lack of hardwoods; (3) the predominantly xeric conditions; and (4) the lack of known sites, Protocol, pre-disturbance surveys for mollusks were conducted for the Beaver Creek and the Uptown projects , approximately one to seven miles south and two to seven miles southwest of the project, respectively. These surveys covered approximately 3,700 acres with no detections of blue-gray taildroppers (USDA Forest Service no date).

Effects of the proposed alternatives
Alternative 1 – No action
In the absence of large scale natural disturbance it is unlikely that the amount of blue-gray taildropper habitat would change in the near future. However, FFE modeling

indicates several general patterns regarding fire behavior and fire induced tree mortality over time including (1) a constant or increasing crown fire potential under both moderate and severe weather conditions, (2) an increase in surface fire intensity under both moderate and severe weather conditions, and (3) either a constantly high or increasing level of tree mortality and basal area reduction. Because this species is associated with moist sites containing high levels of shade, these patterns could potentially result in a significant loss of blue-gray taildropper habitat.

Alternatives 2, 4, and 5 – Action Alternatives
The action alternatives would have similar effects to blue-gray taildroppers and will be discussed together.

Thinning and Fuels Reduction
Thinning and fuels reduction treatments are proposed in suitable blue-gray taildropper habitat. However, project conservation measures for treatments within and adjacent to known sites ensure that ≥60 canopy cover, large DWD, and sufficient forest floor litter is retained within and adjacent to known sites. Thus impacts to specific habitat components and stand microclimates are expected to be insignificant. Additionally, FFE modeling indicates a change in fire behavior over time following thinning and fuels treatments that would decrease the likelihood of fire having significant impacts to blue-gray taildropper habitat. Over time, thinning is expected to have beneficial effects on blue-gray taildroppers by promoting the development of structurally complex, late-successional forests.

Temporary Road and Landing Construction
Approximately 0.2 mile of temporary road construction is proposed in potential blue-gray taildropper habitat. If surveys indicate that this habitat is occupied, road segments will be dropped or realigned to avoid impacts to habitat. Thus, temporary road construction will have no impact to blue-gray taildropper habitat. No landings are proposed in potential blue-gray taildropper habitat.

Because blue-gray taildroppers inhabit moist forests and their dispersal capabilities are expected to be limited (see Burke et al. 2000), temporary spur roads have the potential to isolate populated sites. However, because all temporary spur roads will be decommissioned, impacts to blue-gray taildropper population contiguity are only expected to occur in the short term until favorable habitat conditions become reestablished on decommissioned roads.

Road Related Activities
Road related activities are not expected to impact blue-gray taildropper habitat.

Cumulative Effects
Past timber harvest and road construction has likely removed or degraded the quality of blue-gray taildropper habitat and created some barriers to dispersal. Because reasonably foreseeable future actions in the project area are not expected to significantly alter the

microclimate of stands typically occupied by this species and do not include road construction, these actions are not expected to impact blue-gray taildroppers.

Determination
Because temporary roads may create short term barriers to dispersal, the project **"may impact individuals, but is not likely to result in a trend toward federal listing or a loss of viability,"** for the bluegray taildropper.

14) **Tehama chaparral**
Environmental Baseline
Tehama chaparral snails are listed as FS Region 5 Sensitive Species due to a small number of known sites.

The Tehama chaparral snails range is very limited; currently only known from 11 sites in Northern California (8 sites in Siskiyou County, 1 in Tehama County, 1 in Shasta County, and 1 in Butte County). Known locations on the KNF include areas along the Shasta River on the Scott River Ranger District.

Habitat for the Tehama chaparral includes shaded talus and rockpiles (Weasma 1999). When environmental conditions are favorable, individuals may range from their refugia and can be found under leaf litter and other debris in adjacent forested habitat (Ibid). On the KNF, the occurrence of rock as a dominant surface and subsurface feature is common to all known sites (USDA Forest Service 2003).

Within the project area suitable habitat for the Tehama chaparral snail is limited to isolated patches of shaded talus. Due to the predominately xeric conditions and the lack of known sites adjacent to the project area (protocol, pre-disturbance surveys for mollusks were conducted for the Beaver Creek and the Uptown projects approximately one to seven miles south and two to seven miles southwest of the project, respectively with no detections of Tehama chaparral snails) (USDA Forest Service no date) the likelihood that the species is present within the project area is small.

Effects of the proposed alternatives
Alternative 1 – No action
In the absence of large scale natural disturbance it is unlikely that the amount of Tehama chaparral habitat would change in the near future. However, FFE modeling indicates several general patterns regarding fire behavior and fire induced tree mortality over time including (1) a constant or increasing crown fire potential under both moderate and severe weather conditions, (2) an increase in surface fire intensity under both moderate and severe weather conditions, and (3) either a constantly high or increasing level of tree mortality and basal area reduction. These patterns have the potential to impact Tehama chaparral habitat by reducing shading of talus.

Alternatives 2, 4, and 5 – Action Alternatives
The action alternatives would have similar effects to Tehama chaparral snails and will be discussed together.

Thinning and Fuels Reduction
Thinning and fuels reduction treatments are proposed in potential Tehama chaparral habitat. However, project conservation measures for these treatments ensure that $\geq$60 canopy closure existing of the larger mature trees, large DWD, and sufficient forest floor litter is retained within and adjacent to known sites. Additionally, no heavy equipment will be used on talus slopes. Thus, impacts to specific habitat components and stand microclimates are expected to be insignificant. Additionally, FFE modeling indicates a change in fire behavior over time following thinning and fuels treatments that would decrease the likelihood of fire having significant impacts to the microclimates of stands within and surrounding talus slopes.

Temporary Road and Landing Construction
Approximately 0.1 mile of temporary road construction is proposed in potential Tehama chaparral habitat. If surveys indicate that this habitat is occupied, road segments will be dropped or realigned to avoid impacts to habitat. Thus, temporary road construction will have no impact to Tehama chaparral habitat. No landings are proposed in potential Tehama chaparral habitat.

Because Tehama chaparral snails can not tolerate xeric conditions and are slow to disperse, construction of temporary roads has the potential to restrict movements and isolate populations. However, because all temporary spur roads will be decommissioned, these impacts are only expected to occur in the short term until favorable habitat conditions become reestablished on decommissioned roads.

Road Related Activities
Road related activities are not expected to impact Tehama chaparral habitat.

Cumulative Effects
Past timber harvest and road construction has likely removed or degraded the quality of Tehama chaparral habitat and created some barriers to dispersal. Because reasonably foreseeable future actions in the project area are not expected to impact riparian habitat, appreciably alter the microclimate within talus slopes, and do not include road construction, these actions are not expected to adversely effect Tehama chaparral snails.

Determination
Because temporary roads may restrict movements in the short term , the project **"may impact individuals, but is not likely to result in a trend toward federal listing or a loss of viability,"** for the Tehama chaparral snail.

15) **Siskiyou Mountain Salamander**
Environmental Baseline
The range of the Siskiyou Mountains Salamander (SMS) is limited to portions of three counties in southwestern Oregon and northern California (Clayton & Nauman 2005). The project area is outside of the currently known range of the species but is within the survey and manage boundary (Clayton et al. 1999). The closest known SMS site to the

project area is approximately 7.5 miles to the northwest, on the north side of the Siskiyou Crest.

Siskiyou Mountains salamanders are found on forested slopes where rocky soils and talus outcrops occur. Occupied habitat for the species ranges from small, isolated rock outcrops to entire hillsides (Clayton et al. 2004). Although an association with closed canopy forests on north facing slopes has been reported (Nussbaum 1974; Ollivier et al. 2001), the species can be found in stands containing a more open canopy and all slope aspects (Farber et al. 2001; Clayton et al. 2004; CDFG 2005).

Siskiyou Mountains salamanders are lungless salamanders that require moisture in order to respire through their skin and avoid desiccation (Nussbaum et al. 1983). These traits limit the time the species can be active at the surface where they forage (Nussbaum et al. 1983; Feder 1983). Surface conditions favorable for foraging are therefore limited to brief periods when soil moisture and relative humidity are high and temperatures are moderate (Feder 1983; Nussbaum et al. 1983; Clayton et al. 1999).

Habitat for SMSs in the project area is limited to isolated pockets of shaded talus. Surveys for this species adjacent to the project area failed to detect the presence SMS (protocol, pre-disturbance surveys for SMS were conducted on approximately 100 acres for the Beaver Creek and the Uptown projects approximately one to seven miles south and two to seven miles southwest of the project, respectively). Thus, the likelihood that this species is present in the project area is low. However, because surveys for the Beaver Creek and Uptown projects were not designed to determine the absence of the species (Clayton et al. 1999), new sites continue to be found, and habitat for the species exists, the presence of SMS in the project area can not be ruled out.

Because the physiology of SMSs limits them to moist, cool environments, events or actions that dramatically disrupt the microclimate of an occupied site are considered to be the major threat to the species.

Effects of the proposed alternatives
Alternative 1 – No action
In the absence of large scale natural disturbance it is unlikely that the amount of SMS habitat would change in the near future. However, FFE modeling indicates general patterns of fire behavior over time that include an increase in surface fire intensity and constantly high or increasing tree mortality. These patterns have the potential to impact SMS habitat by reducing shading of talus and altering microclimates within occupied stands.

Alternatives 2, 4, and 5 – Action Alternatives
The action alternatives would have similar effects to SMS and will be discussed together.

<u>Thinning and Fuels Reduction</u>
Thinning and fuels reduction treatments are proposed in potential SMS habitat. Because SMSs are NWFP survey and manage species, survey and manage S&Gs for this species

have been incorporated into the project. Thus, potential SMS habitat will be surveyed or buffered by one site potential tree. Within this buffer, no overstory trees will be removed and no disturbance of talus or rock substrate will occur. Additionally, no heavy equipment will be used on talus slopes regardless of survey results. Thus, impacts to specific habitat components and microclimates within potential habitat are expected to be minimal. FFE modeling also indicates a change in fire behavior over time following thinning and fuels treatments that would reduce the likelihood of fire having significant impacts to microclimates within and adjacent to talus slopes.

Temporary Road and Landing Construction

Approximately 0.1 mile of temporary road construction is proposed in potential SMS habitat. If surveys indicate that this habitat is occupied, road segments will be dropped or realigned to avoid impacts to habitat. Thus, temporary road construction will have no impact to SMS habitat. No landings are proposed in potential SMS habitat.

Forest roads have been shown to be partial barriers to movement for some Plethodontid salamanders (Marsh et al. 2004). However, all occupied SMS sites will be buffered by one site potential tree (150 to 175 feet), within which, no temporary road construction would occur. Additionally, all temporary roads will be decommisioned (closed, recountoured and/or restoring natural slope, revegetated, etc.) after use. Due to the SMSs limited dispersal capabilities, few individuals would likely disperse as far as any of the temporary spur roads prior to these roads being decommissioned. Thus, temporary spur roads are not expected to appreciably impair SMS movements across the landscape.

Road Related Activities

Road related activities are not expected to impact SMS habitat.

Cumulative Effects

The action alternatives will have no effect on SMS habitat; therefore, there will be no cumulative effects from the proposed alternatives combined with other actions in the project area.

Determination

The project will have **"no effect"** on Siskiyou Mountain salamanders.

VII. PROJECT SUMMARY OF DETERMINATIONS FOR ALL SPECIES

Species:	**Determination of Effects**
Northern spotted owl	May affect, and is not likely to adversely affect
NSO critical habitat	May affect, and is not likely to adversely affect
Bald eagle	No effect
Shortnose sucker	No effect; no habitat in project area
Lost River sucker	No effect; no habitat in project area
Tidewater goby	No effect; no habitat in project area
Peregrine falcon	No effect
Northern goshawk	No effect
Great gray owl	No effect
Willow flycatcher	May impact individuals, but not likely to lead to a trend

Species:	Determination of Effects
	toward Federal listing or loss of viability
California wolverine	May impact individuals, but not likely to lead to a trend toward Federal listing or loss of viability
Pacific fisher	May impact individuals, but not likely to lead to a trend toward Federal listing or loss of viability
American marten	May impact individuals, but not likely to lead to a trend toward Federal listing or loss of viability
Pallid bat	May impact individuals, but not likely to lead to a trend toward Federal listing or loss of viability
Townsend's big-eared bat	May impact individuals, but not likely to lead to a trend toward Federal listing or loss of viability
Northwestern pond turtle	May impact individuals, but not likely to lead to a trend toward Federal listing or loss of viability
Foothill yellow-legged frog	No effect
Cascade frog	No effect
Blue-gray taildropper	May impact individuals, but not likely to lead to a trend toward Federal listing or loss of viability
Tehama chaparral	May impact individuals, but not likely to lead to a trend toward Federal listing or loss of viability
Siskiyou mountains salamander	No effect
Marbled murrelet	Outside of range
Marbled murrelet critical habitat	Outside of range
Swainson's hawk	No effect; no habitat in project area
Greater sandhill crane	No effect; no habitat in project area
Southern torrent salamander	Outside of range
Sierra Nevada red fox	Outside of range

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Table 1. Primary Project elements by proposed alternative.

Action[1]	**Alternative 2**	**Alternative 4**	**Alternative 5**
Restoration thinning trees > 9” (acres)	2589	2079	2579
Restoration thinning trees < 9” (acres)	408	408	408
DFPZ thinning (acres)	1286	1275	1202
Weeding and Cleaning (acres)	3875	3354	3781
Helicopter (acres)	1071	861	1245
Skyline (cable) (acres)	1602	1528	1471
Ground based (acres)	1202	965	1065
Whole tree removal (acres)	1202	989	1065
Mastication (acres)	809	970	1120
Hand piling and burning (acres)	2395	2154	2331
Underburning (acres)	2601	2497	2615
Thinning of trees < 9’ in riparian reserves (acres)	303	303	303
Landing modification (number)	7	7	7
Landing construction (number)/(acres)	40/25	34/22.5	31/21
Temporary spur construction (miles)	6.86	4.96	2.27
Road maintenance (miles)			
Road decommissioning (miles)	0.49	0.49	0.49
Road closures (miles)	9.30	9.30	9.30
Road designation (miles)	2.43	2.43	2.43

[1] Because more than one fuel treatment may occur on a given acre (i.e., mastication followed by hand piling and burning) acres of fuel reduction treatments reported in this table exceed the actual total acres to be treated.

Table 2. 2002-2006 survey results for NSO activity centers whose estimated home ranges overlap the Mount Ashland Habitat Restoration and Fuels Reduction Project area and have actions proposed within their boundaries.

Activity Center #	Name	2002	2003	2004	2005	2006
KL1167 (SK102)	Deer Cr.	M	M	NS	M	M
KL1169 (SK291)	N. Hungry Cr.	NR	NR	?	?	?
KL1176 (SK041)	S. Cottonwood Cr.	NS	NS	NS	NR	NR
KL1178 (SK220)	Grouse Cr.	NR	P/UN	NS	M	P/Non
KL1180 (SK101)	Cow Cr./Long John Cr.	P/J1	P/J2	NS	M	P/J2
KL1185 (SK307)	Upper Grouse Cr.	NR	NS	M	M	M
KL1188 (SK308)	W. Branch Long John	NR	NR	NS	NS	NR
KL1189	Long John	NR	NR	NS	NS	P/Non
KL1267 (SK449)	Fly Stain Cr.	P/UN	NR	NS	NR	NR
KL1297 (SK320)	N. Cottonwood Cr.	P/Non	M	P/Non	P/Non	M
KL1310 (SK501)	Lower Grouse Cr.	P/UN	M	NS	NR	P/J2
KL1311 (SK529)	W. Fork Big Red Mtn.	P/J2	NR	NS	NS	P/J2

M: single male
P/UN: pair, nesting status unknown
P/Non: non-nesting pair
P/J1: pair with one juvenile
NR: surveyed, no response
NS: not surveyed

Table 3. Acres of suitable habitat within core areas and home ranges of NSOs located within 1.3 miles of the Mount Ashland Habitat Restoration and Fuels Reduction Project stands.

Activity Center #	Name	**Pre-treatment Core (0-0.7mi)**			**Pre-treatment Home range (0-1.3 mi)**			**Habitat Removed/ downgraded Core (0-0.7mi)**		**Habitat Removed/ downgraded Home Range (0-1.3mi)**	
		NR	**F**	**Total**	**NR**	**F**	**Total**	**NR**	**F**	**NR**	**F**
KL1167 (SK102)	Deer Cr.	34	405	**439**	400	1197	**1597**	0	0	0	**0.5**
KL1169 (SK291)	N. Hungry Cr.	115	658	**773**	272	1834	**2106**	0	0	0	**0.5**
KL1176 (SK041)	S. Cottonwood Cr.	69	610	**679**	319	1499	**1818**	0	0	0	0
KL1178 (SK220)	Grouse Cr.	16	291	**307**	45	712	**757**	0	**0.5**	0	**0.7**
KL1180 (SK101)	Cow Cr./Long John Cr.	23	210	**233**	154	638	**792**	0	**0.5**	0	**2.5**
KL1185 (SK307)	Upper Grouse Cr.	79	209	**288**	85	489	**574**	0	0	0	0
KL1188 (SK308)	W. Branch Long John	15	122	**137**	26	370	**396**	0	0	0	**4**
KL1189	Long John	2	127	**129**	14	522	**536**	0	0	0	**6**
KL1267 (SK449)	Fly Stain Cr.	256	456	**712**	395	1622	**2017**	0	**0.5**	0	**0.5**
KL1297 (SK320)	N. Cottonwood Cr.	138	161	**299**	390	776	**1166**	0	0	0	0
KL1310 (SK501)	Lower Grouse Cr.	2	191	**193**	111	1129	**1240**	0	**0.2**	0	**1**
KL1311 (SK529)	W. Fork Big Red Mtn.	151	83	**234**	595	373	**968**	0	0	0	**2**

Table 4. KNF and private land projects used to update the 2005 digital orthophoto quads in creating the NSO habitat baseline for the Mount Ashland Habitat Restoration and Fuels Reduction Project.

THP Name and/or Landowner	Year	Type of Action	Acres[1]	Location
Sterling (Timber Products)	2005	Timber Harvest	64	T48N; R8W; Sec 19
Caswell	2004–2005	Timber Harvest	136	T41S; R1E; Sec 18
Caswell	2004–2005	Timber Harvest	520	T41S; R1E; Sec 8
Caswell	2004–2005	Timber Harvest	24	T41S; R1W; Sec 13
Caswell	2006–2007	Roadside hazard tree removal	NA	T41S; R1E; Sec 18
Meriwether	2006	Timber Harvest	102	T40S; R1E; Sec 28
Kunkle	2005	Timber Harvest	Approx. 50 acres	T41S; R1E; Sec 17
Hungry Parrot (Fruitgrowers Supply Co.)	2006	Timber Harvest	10	T48N; R8W; Sec 25
Klamath NF (Tennis Thin)	2006–2007	Timber Harvest	175	T41S; R1E; Sections 9 and 16
Klamath NF (Colestein Project)	2006	Timber Harvest	425	T40S; R1E; Sections 34 and 35
Klamath NF	On-going	Pre-commercial thinning	unknown	unknown

[1] Data in this column represent total acres of the action not acres of NSO habitat impacted by these projects.

Table 5. Reasonably foreseeable future actions considered for NSO cumulative effects analyses for the Mount Ashland Habitat Restoration and Fuels Reduction Project.

THP Name and/or Landowner	Year	Type of Action	Acres1	Location
Caswell	unknown	Timber Harvest	unknown	T41S; R1E; Section 18
Caswell	unknown	Timber Harvest	unknown	T41S; R1E; Section 8
Caswell	unknown	Timber Harvest	unknown	T41S; R1W; Section 13
Bumblebee	2007	Timber Harvest	Approx. 100	T48N; R8W; Section 33
Hungry Youth	2009	Timber Harvest	Approx 1,000	T48N; R8W; Sections 13, 24, 25, and 30
USFS	On-going	Grazing	Project area	Area wide
USFS	On-going	Recreation	Project area	Area wide
USFS	On-going	Plantation thinning	unknown	Unknown

[1] Data in this column represent total acres of the action not acres of NSO habitat impacted by these projects.

Table 6. Cumulative acres of suitable habitat removed/downgraded within core areas and home ranges of NSOs located within 1.3 miles of the Mount Ashland Habitat Restoration and Fuels Reduction Project stands.

Activity Center #	Name	Pre-treatment Core (0–0.7mi)			Pre-treatment Home Range (0–1.3 mi)			Cumulative Habitat Removed/downgraded Core (0–0.7mi)		Cumulative Habitat Removed/ downgraded Home Range (0–1.3mi)	
		NR	F	Total	F	F	Total	NR	F	NR	F
KL1167 (SK102)	Deer Cr.	34	405	439	400	1197	1597	0	0	0	4.5
KL1169 (SK291)	N. Hungry Cr.	115	658	773	272	1834	2106	0	0	0	55.5
KL1176 (SK041)	S. Cottonwood Cr.	69	610	679	319	1499	1818	0	0	0	5
KL1178 (SK220)	Grouse Cr.	16	291	307	45	712	757	0	0.5	0	0.7
KL1180 (SK101)	Cow Cr./Long John Cr.	23	210	233	154	638	792	0	0.5	0	2.5
KL1185 (SK307)	Upper Grouse Cr.	79	209	288	85	489	574	0	0	0	0
KL1188 (SK308)	W. Branch Long John	15	122	137	26	370	396	0	0	0	4
KL1189	Long John	2	127	129	14	522	536	0	0	0	6
KL1267 (SK449)	Fly Stain Cr.	256	456	712	395	1622	2017	0	0.5	0	25.5
KL1297 (SK320)	N. Cottonwood Cr.	138	161	299	390	776	1166	0	0	0	0
KL1310 (SK501)	Lower Grouse Cr.	2	191	193	111	1129	1240	0	0.2	0	1
KL1311 (SK529)	W. Fork Big Red Mtn.	151	83	234	595	373	968	0	0	0	2

Map 1. Proposed Action for the Mount Ashland Habitat Restoration and Fuels Reduction Project.

Map 2. NSO nesting/roosting, foraging, and dispersal habitat, and estimated core areas and home ranges within the NSO analysis area for the Mount Ashland Habitat Restoration and Fuels Reduction Project.